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June 25, 1966

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

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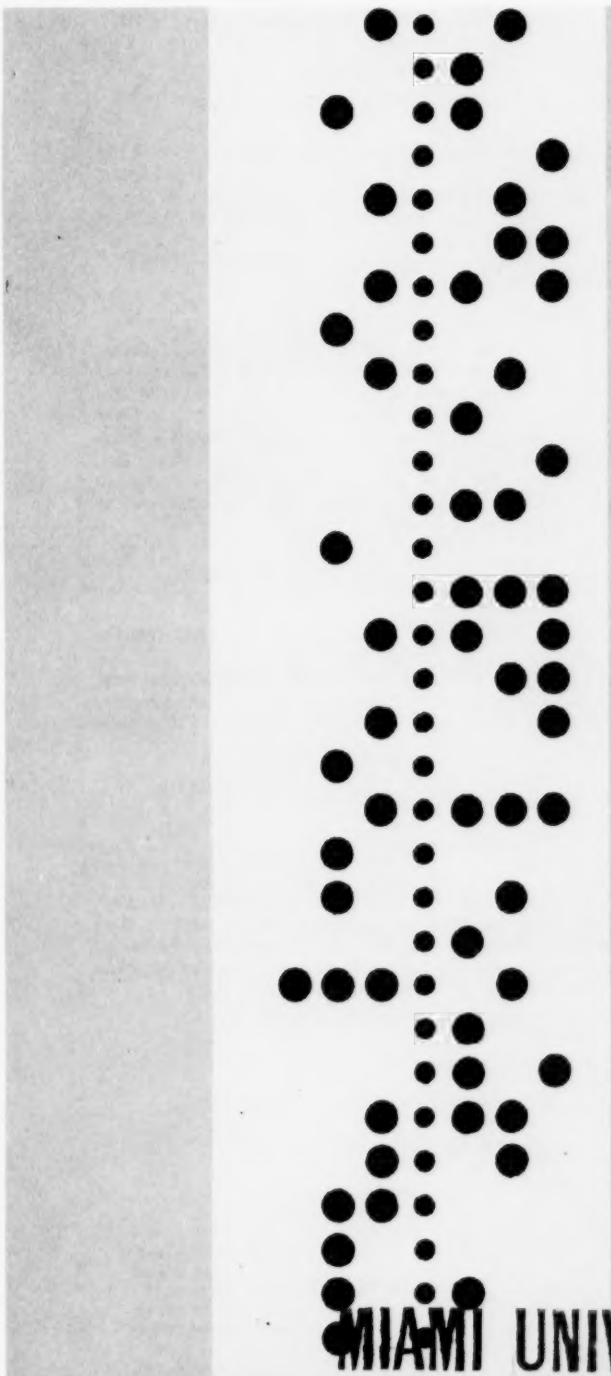

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- *List of Current R & D Projects*
- *Indexes*

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June 25, 1966 / Volume 41, Number 12

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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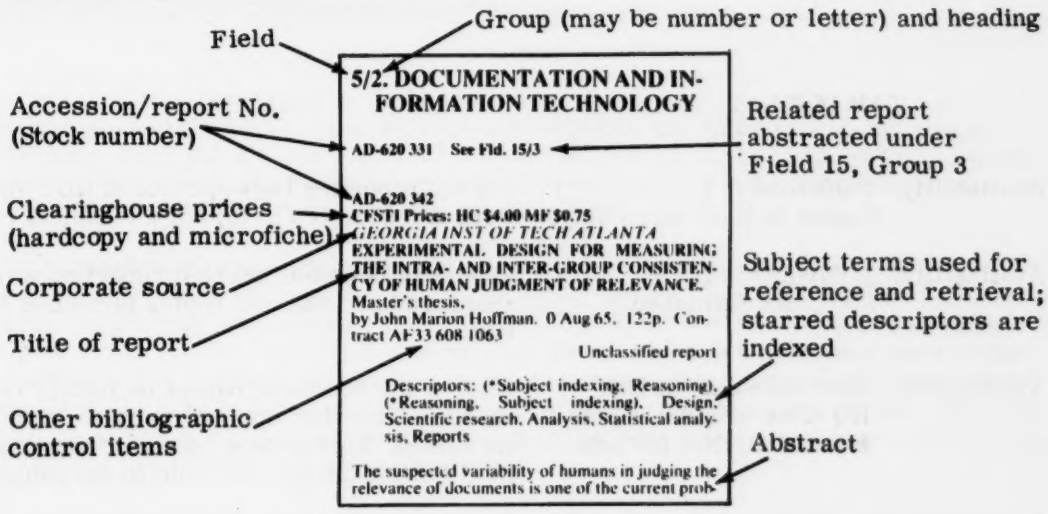
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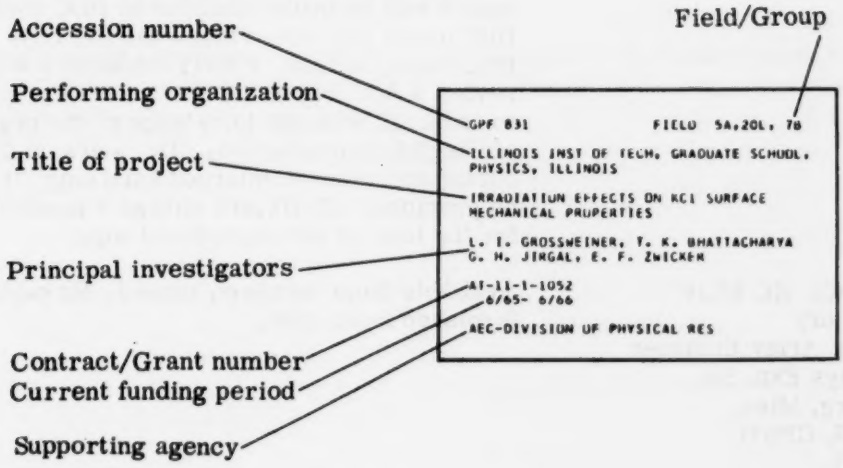

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Effective immediately, subscriptions to both publications will be handled by the Clearinghouse. All orders or correspondence covering either of these publications should be addressed to the Clearinghouse, U. S. Department of Commerce, Springfield, Va. 22151.

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02 AGRICULTURE S-2

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 2, S-2

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 5, S-2

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 9, S-3

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 17, S-16

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY 46, S-18

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY 56, S-20

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING 61, S-21

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10 ENERGY CONVERSION (Non-Propulsive) 70, S-24

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Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 75, S-26

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13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 79, S-26

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14 METHODS AND EQUIPMENT 83, S-29

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15 MILITARY SCIENCES 86

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 87

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17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 88, S-29

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY 90, S-29

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear power plants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE 92, S-31

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS 92, S-32

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

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22 SPACE TECHNOLOGY 114, S-39

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

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Biological and Medical Sciences

ARTIFICIAL HEART FEASIBLE IN 5 TO 10 YEARS

(Order Stock Nos. PB-169 831 Studies Basic to Consideration of Artificial Heart Research and Development Program, HC $7.00/MF $1.75
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PB-169 967 Studies Basic to Consideration of Artificial Heart Research and Development Program, HC $3.00/MF $0.50
PB-169 966 Bibliography and Reference, Studies Basic to Consideration of Artificial Heart Research and Development Program, $3.00/MF $0.75
AD-619 673 Proposed Specification For Artificial Heart To Be Implanted in the Chest, $2.00/MF $0.50.)

"The artificial heart is now primarily a technological problem rather than one of medical research," according to a special scientific and engineering study made for the National Heart Institute. It is one of 7 independent studies made for the Institute which agree that a completely implantable artificial heart is feasible and can be developed within 5 to 10 years. The studies offer technical plans and guide-

lines for specific research leading to a safe, reliable, artificial heart that is practical and workable and that will satisfy all the physiological, engineering, and clinical requirements. They provide basic recommendations, data, and guidelines for the National Heart Institute to use in making decisions and arriving at an overall program plan for the development of an artificial heart. "Perhaps no other single program envisioned today encompasses such a spectrum of disciplines involving all the biological, physical, and social sciences," says a report by General Dynamics. "It touches almost every conceivable technological area and demands the utmost in management and control." A study by the Children's Hospital Medical Center, Boston, and Thermo Electron Engineering Corporation says, "No critical shortage in manpower, materials or facilities will interfere with the widespread use of artificial heart devices if the vast majority of patients can be rehabilitated sufficiently to leave the hospital following surgery." However, their report cautions, "The basic objective of the artificial heart program must be not only to prevent the maximum number of premature deaths from heart disease but also to permit most patients to return to a productive life. The achievement of this objective is essential to the economic feasibility of the program which requires that a large fraction of the total heart disease population be rehabilitated sufficiently to return to gainful employment. "If patients can only be kept alive in the hospital, the program will become an economic albatross."

The reports observe that a well balanced and effective program to combat heart disease must include public education and basic research aimed at the prevention of heart disease, and a network of regional centers to make currently available techniques for diagnosis and treatment accessible to more people. A report by the Hamilton Standard Division of United Aircraft Corporation sets up a proposed program schedule that foresees the complete qualification of 1,000 cardiac surgeons who will start mass implantation of 150,000 artificial hearts per year by 1975. These replacement heart implants are estimated to cost about $5,000, exclusive of rehabilitation and other treatments, according to a study made by Westinghouse Electric.

Less expensive devices such as a left ventricular bypass heart pump could save another 250,000 patients with diseased hearts. This is the "artificial heart" pump used by Dr. Michael E. DeBakey and a team of surgeons and engineers at Houston's Methodist Hospital in April. The device assumed as much as 80 percent of the patient's natural heart's workload and functioned for over 100 hours until the patient died from complications unrelated to the diseased heart or the bypass pump. However, the Hamilton Standard report warns, "... artificial heart technology is in its infancy... major strides must be made before an artificial heart or assist device can be produced for public use." The key words—public use—mean that during a single year about 350,000 potential recipients exist in the United States. Nevertheless, the reports to the National Heart Institute are sanguine. They each have a significant feature in that they take a systems integration and development approach. This concept has been used successfully by these firms to perfect technology related to aerospace and defense systems.

RADIATION DOSIMETRY MANUAL UPDATED

(Order Stock No. AD-631 318 Manual of Radiation Dosimetry Experiments, HC $6.00/MF $1.25.)

Ten experiments covering the general field of radiobiological dosimetry techniques are set forth in a manual compiled for the Armed Forces Radiobiology Research Institute. The manual supplants an earlier one issued in July 1964. The experiments are intended for use in the AFRRI training program as a self-taught course for incoming technical personnel who have little or no knowledge of the methods and techniques of making dosimetry measurements. They are primarily concerned with the dosimetric systems and techniques used by the AFRRI Radiation Physics Division in support of reactor operations and radiobiological research studies. The experiments are written in such a way that an individual desiring to familiarize himself with the instrumentation and laboratory techniques can do so by following the experimental procedures as outlined. On the other hand, anyone desiring a basic understanding of the general principles of radiation dosimetry can study the theory section of each experiment and the reference material, in addition to performing the experiments as outlined. According to AFRRI, a thorough study of the material contained in the manual should give one a basic understanding of the general field of radiation dosimetry.

NEW BLOOD CELL SEPARATOR DEVELOPED

(Order Stock No. PB-169 921 NCI - IBM Blood Cell Separator Drawings and Specifications, $75.00 for 5 spools of 35 mm microfilm.)

An in vivo blood cell separator recently developed through the joint efforts of the National Cancer Institute and IBM is an effective tool in science's fight against cancer through the use of drugs. The Institute notes that in treating certain cancers with drugs, there is an adverse effect on white cells which combat infection, and on platelets which are important in preventing hemorrhaging. The principle objective in designing the in vivo blood cell separator was to separate white cells and platelets from the whole blood of a healthy donor so those fractions can be used for treating the cancer patient. The donor's blood moves through the machine on a continuous basis, the white cells and platelets being removed and the remainder of the red blood being returned to the donor via another vein.

The machine works like this: It takes a donor's blood from a vein, meters anticoagulant into the blood, and then pumps the blood to a plastic buffer bag, from which it flows by gravity into a rotating centrifuge. The centrifuge separates certain of the blood's components, including red cells, white cells, plasma, and platelets. These fractions are removed separately from the centrifuge on a continuous flow basis, and one or more of them can be diverted into a sterile plastic bag, the remaining fractions then recombining to be returned to the donor via a second vein.

The machine features a number of automatic controls. One is a sensor that will recognize the collapse of a donor's vein. Another automatically recognizes the presence of air bubbles and provides feedback control to warn the operator and, if necessary, shut down the machine. As the blood cools slightly while passing through the centrifuge, the machine has a provision for reheating the blood on its way to the return line. In addition, a monitor checks the level of the anticoagulant supply and provides controls to signal a low level. If the supply is not replenished, feedback will shut down the main input pump and ring a buzzer. The complete specifications and drawings for commercial production of the NCI-IBM blood separator are available from the Clearinghouse on 5 spools of 35 mm microfilm.

Chemicals

SPACE AGENCY HANDBOOK REVIEWS PLASMA JET TECHNOLOGY

(Order Stock No. N65-34909 Plasma Jet Technology, HC $1.00/MF $1.25.)

A handbook produced by NASA's Technology Utilization Division reviews plasma jet technology and covers generators, arc technology, and instrumentation. The publication describes plasma stream temperatures of 10,000 to 30,000°F that fragment chemical compounds into radicals and atoms to form compounds different from those initially introduced. For example, methane yields acetylene when passed through a plasma arc of helium, argon, or hydrogen. Plasma technology, says NASA, has added about $100 million to the gross national product, plus many additional defense and space benefits.

INTERNATIONAL CONGRESS CHEMISTRY ABSTRACTS AVAILABLE

(Order Stock No. CONF-650723 Abstracts of Scientific Papers Presented at the 20th International Congress of Pure and Applied Chemistry, HC $2.00/MF$1.25.)

Abstracts of scientific papers presented at the 20th International Congress of Pure and Applied Chemistry in Moscow in 1965 have been compiled in a single volume by the AEC. Papers were grouped under these topics: physical chemistry of surface phenomena and disperse systems, radiation chemistry, inorganic chemistry, analytical chemistry, cosmic chemistry, and chemical technology. The latter topic contains abstracts on the determination of mechanisms of complex reactions, macrokinetics of chemical processes in high-temperature gas jets, physico-chemical principles of reactors for dehydrogenation of butane and butene, equipment for the reaction of solids at high temperatures, statistical methods as an aid in the choice between continuous and batch technologies, and influence of surface phenomena on mass transfer.

Control Systems and Instrumentation

COMPUTING TECHNIQUE SOLVES FLUID FLOW PROBLEMS

(Order Stock No. LA-3425 The MAC Method, A Computing Technique for Solving Viscous Incompressible, Transient Fluid Flow Problems Involving Free Surfaces, HC $4.00/MF $1.00.)

Los Alamos Scientific Laboratory has developed what it calls a marker-and-cell (MAC) technique for solving fluid flow problems. The method makes use of a high-speed digital computer. The fluid is incompressible, viscous, and moves through large-amplitude contortions in several space dimensions. There may be a free surface upon which waves can form and break, or the flow may be entirely confined by walls. Development of the fluid configuration can be investigated through as much elapsed time as desired. The motions are calculated by using the complete Navier-Stokes equations, including all nonlinear terms. The only approximations arise from the finite-difference representation. Pressure and velocity are used directly as the dependent variables. Neither stream function nor vorticity enters except as results derived from the velocity field.

Metals, Non-Ferrous and Alloys

GUIDE AIDS IN EXTRACTIVE METALLURGY OF VANADIUM

(Order Stock No. PB-169 681 Thermodynamic Properties of Vanadium and Its Compounds, HC $3.00/MF $0.75.)

The U.S. Bureau of Mines has prepared a compilation of the thermodynamic properties of vanadium and its compounds which is a guide for experimentation to improve present methods or to develop better methods of extractive metallurgy. The publication is divided into three main sections. The first summarizes basic metallurgical thermodynamic data for vanadium and its compounds and includes heat capacities, entropies, heat contents, heats of vaporization, free energies of vaporization, vapor pressures, temperatures of phase changes, heats of phase changes, heats of formation, and free energies of formation. The second section—an application of basic data—contains heats, free energies, equilibrium pressures, and equilibrium constants of reactions of vanadium compounds with special emphasis on metallurgical reactions. The final section supplies basic thermodynamic data for elements and compounds associated with metallurgical reactions of vanadium. The Bureau of Mines states that by indicating the direction of experimentation, this report enables the saving of time, effort, and much expense which would otherwise be necessary for trial and error experimentation.

ALLOYS STUDIED FOR DEEP-SEA CORROSION

(Order Stock No. AD-626 586 Effect of Deep Ocean Environments on the Corrosion of Selected Alloys, HC $2.00/MF $0.50.)

A deep-sea corrosion study by the Naval Civil Engineering Laboratory tested 8 alloys at depths ranging from 2340 to 5640 feet for periods of time ranging from 123 to 1064 days. A nickel base alloy, Hastelloy C, was uncorroded under all conditions, while an austenitic stainless steel 20-CB had only crevice corrosion after 197 days of exposure at a depth of 2340 feet. Copper alloy No. 715, alloy steel AISI 4130 and certain extra high strength low alloy steels corroded uniformly, but their corrosion rates decreased with increasing time of exposure regardless of depth. Aluminum alloy 5086-H34, however, was attacked by intergranular corrosion, which was manifested by pitting and edge penetration. It was also attacked by crevice corrosion, rates and pit depths increasing with time of exposure.

TUNGSTEN-BASE ALLOYS EVALUATED

(Order Stock No. AD-468 299 Development and Evaluation of Tungsten-Base Alloys, HC $3.00/MF $0.75.)

The consolidation of tungsten-base alloys containing relatively large additions of carbon in conjunction with Cb, Hf, and/or Zr has been achieved by Climax Molybdenum Co. using vacuum-arc-melting procedures. These alloys, when encapsulated in molybdenum, were successfully worked by extrusion, yielding good recoveries of sound billets. The minimum recrystallization temperatures of extruded billets ranged from 3400 to 4800°F. The highest tensile strengths for swaged bars produced during the present work were 78,600 psi at 3000°F, 62,300 psi at 3500°F, 34,200 psi at 4000°F, 21,600 psi at 4500°F, and 6,600 psi at 5000°F. Climax says the strength and recrystallization properties of the bars that were successfully swaged surpassed target properties by wide margins.

TECHNIQUES FOR PREPARATION OF URANIUM SPECIMENS LISTED

(Order Stock No. NLCO-954 Metallography of Uranium: Procedures and Standards, HC $3.00/MF $0.75.)

A manual that presents techniques for the preparation of uranium specimens so their macro- and microstructures may be studied has been prepared by the National Lead Company for the AEC. The compilers suggest the manual can serve as a practical industry-wide guide to the preparation of uranium samples for metallography and for the evaluation of the metal structures revealed. The manual includes procedures for sample preparation, etching, and photography; and metallographic standards for the evaluation of the prepared samples with respect to grain size, recrystallization, and inclusion content.

Nuclear Technology

DEEP LAB FEASIBLE FOR SOLAR NEUTRINO DETECTION

(Order Stock No. AD-631 479 Deep Lab Conference, HC $2.00/MF $0.50.)

An underground laboratory for cosmic ray research and solar neutrino detection can be built 15,000 feet into the earth by using existing technology to overcome the major problems of temperature and mechanical strength. South Africa mining engineers and physicists from the University of the Witwatersrand and the Case Institute of Technology explored the feasibility and costs of such a deep lab at an Oct. 1965 meeting in Johannesburg. A transcript of the conference is now available. A 15,000 foot shaft, 20 feet in diameter, with a lift capable of handling 20 tons, is estimated to cost about $20 million for a South Africa site and $40 million for a U.S. site, cost of labor creating the disparity. However, if a 10,000 foot Western Deep Levels mine 40 miles west of Johannesburg were used, the cost would plunge to about $4 million and take only two years to build as compared with eight years starting from scratch. The conference looked into geology problems (rocks stable, hard and compact most desirable), and temperatures to be faced (280 to 300°F creating the sizable ventilation costs). Geologists and geophysicists might use the deep lab to study the basic mechanical problems of rock creep and to take measurements of radioactivity, magnetic fields, heat and rock stress at different levels. Resistivity, gravity, and combinations of electrical measurements might also be studied.

Power Source Devices

SILVER/ZINC BATTERY CYCLE LIFE MAY BE INCREASED

(Order Stock No. N66-15794 The Improvement of Zinc Electrodes for Electrochemical Cells, HC $2.00/MF $0.50.)

It may be possible to increase the cycle life of silver/zinc batteries by applying recent findings of the Leesona Moos Laboratories. In an investigation made for the Space Agency, LML identified the factors governing the growth of zinc dendrites. Two main parameters which control dendrite growth are: (1) the overpotential which governs the morphology, and (2) the rate and type of zincate diffusion in relation to the geometry of the electrode/electrolyte interface, which controls both the overall growth rate and the selective propagation of individual dendrites. The firm proposes two remedies to provide improvements in the cycle life of silver/zinc batteries: the use of intermittent charging which produces a denser and more even deposit, and a method for elimination of preferential edge growth.

PERFORMANCE OF THERMIONIC CONVERTER ANALYZED

(Order Stock No. N66-18433 Theroretical Background for Thermionic Conversion Including Space-Charge Theory, Schottky Theory, and the Isothermal Diode Sheath Theory, HC $2.00/MF $0.50.)

A theoretical analysis of thermionic converter performance by Massachusetts Institute of Technology significantly advances general understanding of the mechanisms at play in practical converters. The areas of theory treated include (1) space-charge theory used when either electrons or ions are the predominant charge carriers, (2) Schottky mirror image theory for ion and electron emission, and (3) Fowler theory applied to a plasma in equilibrium with an emitting surface, treated in terms of the relation of the plasma potential to surface potentials and in terms of the character of the sheath. Included in the report of the analysis are various graphical and tabulated aids to the analysis of cesium-filled thermionic converters.

Transportation (Land, Sea, Air, Space)

NEW CABLE HAULER AND REEL DEVELOPED BY WOODS HOLE

(Order Stock No. AD-614 071 A Shipboard Cable-Hauling System for Large Electrical Cables, HC $1.00/MF $0.50.)

An air-powered hauling machine and reeling device for use at sea with large electrical cable systems such as hydrophone arrays has been developed by the Woods Hole Oceanographic Institution. The system may be used to haul cables from 0.3 to 2.0 inch diameter. Hauling tensions up to 980 lbs. and speeds up to 430 ft/min are provided for by the apparatus. The principal advantage of the system is that it does not cause the cable to bend while under tension. Reeling is accomplished under only sufficient tension to cause the cable to conform to the reel. Woods Hole notes the increased use during the past several years of large electrical cable systems at sea, which has created a need for a new cable hauling system. Hydrophone arrays, towed magnetometers, geomagnetic-electrokinetographs, and other towed devices pose problems in retrieval, especially while underway.

CHANGES PROPOSED IN CONTROL OF NORTH ATLANTIC AIR-TRAFFIC

(Order Stock No. PB-169 545 The North Atlantic Air-Traffic Control System, Economic Analysis of Proposed Changes, HC $5.00/MF $1.00.)

A cost-benefit analysis to determine the economic impact of implementing certain Federal Aviation Agency-specified technical changes in the North Atlantic Air-Traffic Control System has been completed by the Institute for Defense Analyses. FAA has proposed two basic types of changes: additional ground equipment to increase the capacity of the transition areas, and reduction of separation criteria in the oceanic area. IDA's study shows the extent to which various reductions of separation criteria in the oceanic area would reduce the cost of aircraft diversions. The equipment changes in the transition areas are designed to increase the traffic-handling capacities of these areas and thereby reduce the cost of aircraft delays during peak-flow periods. IDA's study concludes that non-automated surveillance radar coverage should be extended over the entire transition area.

INFORMATION SYSTEM AIDS IN REGIONAL TRANSPORTATION PLANNING

(Order Stock No. PB-169 570 A Survey of Graphic Display Software for Off-Line Plotting, HC $1.00/MF $0.50.)

System Development Corporation is assisting the Bay Area Transportation Study Commission of California in the design and implementation of an information system to support long-range regional transportation planning in the San Francisco Bay Area. One function of this information system is to provide graphic display of information for the visual assessment of spatial patterns of regional growth and transportation system use. The display device selected for this function is an off-line data plotter. A survey has been made to determine the state-of-the-art of the data plotting field. This survey will serve as a guide toward the development of an advanced graphic display capability to be incorporated into the so-called SPAN system. A document prepared by SDC contains a bibliography resulting from the survey and reports on visits to several installations for discussions and demonstrations of hardware.

CURRENT research & development PROJECTS

01 AERONAUTICS

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GQF 3458 2 FIELD 20L,20D

DRAG IN RAREFIED GASES

S. ZIERING

AF-49-638-01228
/65- /

DOD-AIR FORCE

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GQF 3602 2 FIELD 20D

INTERNAL AERODYNAMICS OF SENSITIVE FLOWS

M. ZISFIEN

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/65- /

DOD-AIR FORCE

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GQF 6829 1 FIELD 12A,13M,20D

BROWN UNIVERSITY, GRADUATE SCHOOL, ENGINEERING, RHODE ISLAND

KINETIC MODEL EQUATIONS IN RAREFIED GAS DYNAMICS

T. F. MORSE

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GQF 207518 FIELD 20D,10B

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

BOUNDARY LAYERS IN AXISYMMETRIC HYPERSONIC NOZZLES

E. WALK

/65- /

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GQF 475501 2 FIELD 20M,20D

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, OHIO

STUDY OF SIMILARITY PARAMETERS RELATING MODEL TESTS IN HIGH ENTHALPY HYPERSONIC WIND TUNNELS WITH FULL SCALE FLIGHT CONDITION

S. L. PETRIE, G. M. GREGOREK, J. D. LEE

AF-33-615-2498
/65- /

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GQF 475548 FIELD 12A,13M,20L,20K

LOCKHEED AIRCRAFT CORP, SUNNYVALE, CALIFORNIA

COMPREHENSIVE METHODS FOR ANALYSIS OF DYNAMIC RESPONSE OF AEROSPACE VEHICLES

C. COALE, K. K. FORSBERG

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ZQF 420560 1 FIELD 22C,20D

USAF, ARNOLD AFS, TENNESSEE

EXPANDABLE RE-ENTRY GLIDERS

H. KAUPP

AF-40-600-1000
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ZQN 544163 3 FIELD 11B,11C

USN, BUR YDS + DOCKS, PORT HUENEME, CALIFORNIA

PAINTS FOR AIRFIELD MARKING

R. W. DRISKO, W. S. HAYNES

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DOD-NAVY

03 ASTRONOMY AND ASTROPHYSICS

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GSP 1514 1 FIELD 3A, 3B

UNIV OF PITTSBURGH, GRADUATE SCHOOL, ASTRONOMY, PENNSYLVANIA

DETERMINATION OF THE PARALLAXES OF DWARF STARS

N. E. WAGMAN

NSF-GP-2405
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NSF-PHYSICAL SCIENCES DIVISION

04 ATMOSPHERIC SCIENCES

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GQF 4340 FIELD 20D

MASS INST OF TECHNOL, GRADUATE SCHOOL, METEOROLOGY, MASSACHUSETTS

TURBULENT THERMAL CONVECTION

E. L. MOLLOCHRISTENSE

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GQF 258572 2 FIELD 4A

MARTIN CO BALTIMORE, MARYLAND

EXPER STUDY TO DETERMINE THE NEUTRON CONCENTRATION ABOVE THE EARTHS ATMOSPHERE

J. P. MARTIN

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GQF 259838 2 FIELD 4A

UNIVERSITY OF GENOA, ITALY

MEASUREMENTS OF VLF RADIATIONS FROM UPPER ATMOSPHERIC SOURCES

M. BOSSOLASCO

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ZQF 260001 FIELD 4A,20I

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

RAY TRACING AND THEORETICAL STUDIES

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ZQF 260049 FIELD 12A, 8E

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ERROR ANALYSIS OF METEOROLOGICAL EQUIPMENT

R. W. LENHARD

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ZQF 260063 FIELD 4A

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ROCKET DENSITY MEASUREMENTS

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MODEL ATMOSPHERE STUDIES

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METEOROLOGY 010000

J. H. CONOVER

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ZQF 260176 FIELD 4A,20J

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ABSORPTION SPECTRUM OF THE UPPER ATMOSPHERE

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GQF 260486 3 FIELD 4A, 8+, 9+, 9A

FIELD OBSERVATIONS TO DETERMINE TURBULENT STRUCTURE + DRIFT MOTIONS IN THE IONOSPHERE

K. F. KINNARD

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05 BEHAVIORAL AND SOCIAL SCIENCES

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GQF 3622 2 FIELD 12A, 9D

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, PENNSYLVANIA

EVALUATION OF INFORMATION SCIENCES RESEARCH PROGRAM

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GSS 465 2 FIELD 5A

REED COLLEGE, UNDERGRADUATE SCHOOL, PHYSICS, OREGON

THE HISTORY OF PHYSICS - 1859-1905

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GSS 595 1 FIELD 5C

AMERICAN UNIVERSITY, GRADUATE SCHOOL, DIST OF COLUMBIA

QUANTITATIVE STUDY OF DETERMINANTS OF ECONOMIC PERFORMANCE

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06 BIOLOGICAL AND MEDICAL SCIENCES

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GPE 995 FIELD 8G

UNIVERSITY OF ICELAND, ICELAND

BIOLOGICAL RESEARCH ON THE VOLCANIC ISLAND SURTSEY AND ENVIRON

S. FRIDRICKSSON

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AEC-BIOLOGY + MEDICINE

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GSB 1534 1 FIELD 7C, 7A, 7D,20J

FLORIDA STATE UNIV, GRADUATE SCHOOL, MOLEC BIOL + BIOPHYS, FLORIDA

PHYSICAL-ORGANIC STUDIES OF SEQUENCE PEPTIDE POLYMERS AND OTHER RELATED SYSTEMS

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07 CHEMISTRY

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GPF 41 3 FIELD 7C, 7D,20M, 7B

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

SPECIFIC ATTRACTIONS IN ION EXCHANGE

H. F. WALTON, I. GAMALINDA, H. S. SHERRY K. SHIMOMURA

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HARVARD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

MOLECULAR SPECTROSCOPY OF SUBSTANCES EXISTING AT HIGH TEMPERATURES

W. A. KLEMPERER

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OREGON STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, OREGON

A STUDY OF GENERALIZED ACID-BASE PHENOMENA IN NON-AQUEOUS IONIZING SOLVENTS WITH RADIOACTIVE TRACERS

T. H. NORRIS, S. C. DALTON, P. B. DEGROOT E. J. WOODHOUSE

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GQF 416 6 FIELD 7C,19D,21B, 7A

UNIV OF HULL, UNITED KINGDOM

KINETICS OF THE HYDROGEN-OXYGEN AND HYDROCARBON-OXYGEN REACTIONS

R. R. BALDWIN

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GQF 831 6 FIELD 7C, 7D, 7B

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

ELECTRON SPIN RESONANCE OF FREE RADICALS

G. K. FRAENKEL

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GQF 2240 4 FIELD 7C, 7D, 7B

PRINCETON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW JERSEY

EQUILIBRIA AND MECHANISMS IN IONIC POLYMERIZATION

A. V. TOBOLSKY

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ILLINOIS INST OF TECH, GRADUATE SCHOOL, ILLINOIS

CHEMICAL REACTION IN A MONOTHERMAL FIELD

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GQF 3164 3 FIELD 7C, 7A, 7D, 7B

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

CHEMICAL PROPERTIES OF LABILE SPECIES

P. S. SKELL

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PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

NITRONIC ESTERS

N. KORNBLUM

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WEIZMANN INST OF SCI, ISRAEL

MECHANO-CHEMISTRY OF COUPLED CONTRACTILE AND CHEMICAL RATE PROCESSES

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UNIV OF LUND, SWEDEN

THERMAL STABILITY OF ORGANIC COMPOUNDS

S. SUNNER

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OKLAHOMA STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, OKLAHOMA

NUCLEOPHILIC DISPLACEMENTS ON TRIVALENT PHOSPHORUS

K. D. BERLIN

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REACTION RATE STUDIES OF GASEOUS UNIMOLECULAR ISOMERIZATIONS

F. D. TABBUTT

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GQF 3688 2 FIELD 7C, 7D, 7B

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

SOLVENT ISOTOPE EFFECTS FOR CH3OH VS. CD3OH

E. R. THORNTON

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GQF 3735 1 FIELD 7C, 7D, 7A

HUGHES RESEARCH LABS, MALIBU, CALIFORNIA

ACID-BASE CHARACTERISTICS OF PHOTOTROPISM

J. D. MARGERUM

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CARBONIUM ION RADICALS AND OXY RADICALS

T. G. TRAYLOR

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GQF 3761 1 FIELD 5A

GEORGE WASHINGTON UNIV, GRADUATE SCHOOL, DIST OF COLUMBIA

EVALUATION OF CHEMICAL SCIENCES RESEARCH PROGRAM

J. E. EARLEY

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GQF 3819 FIELD 7D, 7A

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

DIELECTRIC GAS CHROMATOGRAPHIC DETECTOR WINEFORDNER J D

J. D. WINEFORDNER

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GQF 3937 FIELD 7C, 7D,20J, 7B

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, CHEMISTRY, MARYLAND

PHOSPHORUS COORDINATION COMPOUNDS

S. O. GRIM

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GQF 3945 FIELD 7A, 5A

STATE UNIV N Y BUFFALO, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

SYMPOSIUM ON RELAXATION TECHNIQUES IN CHEMICAL KINETICS

R. G. WILKINS

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GQF 3984 FIELD 7C, 7D,20J

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

SYNTHESIS OF TRIPLE STRAND POLYMERS

G. B. BUTLER

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GQF 4364 FIELD 7A, 7D,20M,20J

UNIV OF WEST AUSTRALIA, AUSTRALIA

PROPERTIES OF SOLID NON-STOICHIOMETRIC LANTHANIDE OXIDE PHASES

B. G. HYDE

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GQF 4388 FIELD 7C, 7D,20M, 7B

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

HIGH PRESSURE /3-5 KB./ INORGANIC AND ORGANOMETALLIC SYNTHESES

A. G. MACDIARMID

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GQF 4412 FIELD 7C, 7D, 7B

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

ELECTROLYTIC REDUCTION OF ORGANIC COMPOUNDS

R. A. BENKESER

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STATE UNIV N Y STONY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

PHOTOCHEMICALLY GENERATED VALENCE TANTOMERS

T. D. GOLDFARB, R. S. BOIKESS

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GQF 4444 FIELD 7D,21I,20M, 7B

GENERAL ELECTRIC CORP, PHILADELPHIA, PENNSYLVANIA

SPECTROSCOPIC STUDIES OF THE VAPORIZATION OF HIGH TEMPERATURE MATERIAL

M. J. LINEVSKY

AF-49-638-01513
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GQF 258399 1 FIELD 7C, 7D, 7A, 7B

UNIV OF CONNECTICUT, GRADUATE SCHOOL, CHEMISTRY, CONNECTICUT

INVEST KINETICS + MECHANISMS OF CARBONIZATION OF HYDROCARBONS + ANALYZE GASEOUS REACTION PRODUCTS

S. R. SMITH

AF-19-628-04000
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GQF 259689 FIELD 20D,10B

MITHRAS INC CAMBRIDGE, MASSACHUSETTS

THEORETICAL + EXPERIMENTAL STUDIES OF NITRIC-OXIDE-OXYGEN ATOM REACTION AT SUPERSONIC FLOW

J. A. HILL

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GQF 284860 1 FIELD 7D,20M,12A, 7B

USDC, NATL BUR STAN, DIST OF COLUMBIA

EQUILIBRIUM COMPOSITION OF AIR NITROGEN AND ARGON

J. HILSENRATH

/65- /

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GSB 2416 1 FIELD 7C, 7A, 7D,20J

NEW YORK UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, NEW YORK

SYNTHESIS OF UNUSUAL METALLOPORPHYRINS

M. TSUTSUI, M. ICHIKAWA, M. •. TSUTSUI

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GSP 1271 2 FIELD 7C, 7D, 7B

MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

CHEMISTRY OF COPPER (I) AND SILVER (I) ORGANOMETALLICS

G. M. WHITESIDES

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GSP 1274 2 FIELD 7C, 7D

MICHIGAN STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, MICHIGAN

THERMAL REACTIONS OF OXIRANES

W. H. REUSCH

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GSP 1303 2 FIELD 7C, 7A, 7D,20J

UNIV OF ROCHESTER, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

VINYL FREE RADICALS

J. A. KAMPMEIER

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GSP 1306 2 FIELD 7C

STANFORD UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

BIOGENETICALLY-PATTERNED SYNTHESES OF NATURAL PRODUCTS AND RELATED SUBSTANCES

E. E. VANTAMELEN

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GSP 1311 2 FIELD 7D, 7A, 9A,20J

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

MECHANISMS OF ORGANIC ELECTRODE REACTIONS

A. J. BARD

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GSP 1320 2 FIELD 7C, 7D, 7A

UNIV OF WISCONSIN, GRADUATE SCHOOL, CHEMISTRY, WISCONSIN

KINETICS AND CATALYSIS OF METAL CHELATE REACTIONS

T. J. BYDALEK

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GSP 1999 1 FIELD 20J, 5A

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, PHYSICS, MICHIGAN

INFRARED SPECTRA OF MACROMOLECULES

S. KRIME

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GSP 2001 1 FIELD 20J, 5A,18A,20L

UNIVERSITY OF MISSOURI, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MISSOURI

MOLECULAR VIBRATIONS IN POLYMERS AND RELATED ORGANIC COMPOUNDS

H. R. DANNER

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GSP 2192 FIELD 7A

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MISSOURI

METHODS OF TRANSITION STATE CHARACTERIZATION

J. L. KURZ

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GSP 2196 FIELD 7C, 7D, 7B

XENON PHOTOSENSITIZED REACTIONS OF PERFLUOROALKANES

G. H. MILLER

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GSP 2206 FIELD 7C

CHEMISTRY OF TERPENES AND OTHER CARBOCYCLIC SYSTEMS

E. J. COREY

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GSP 2209 FIELD 7C, 7D

DUQUESNE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

SOLVOLYSIS OF CYCLOPROPYL HALIDES

J. W. HAUSSER

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GSP 2237 1 FIELD 7D

UNIVERSITY OF KANSAS, GRADUATE SCHOOL, CHEMISTRY, KANSAS

CRITICAL OPALESCENCE

B. CHU

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GUE 145 FIELD 7D,20M,20D

PHILCO CORP, NEWPORT BEACH, AERONUTRONIC DIV, CALIFORNIA

INVESTIGATION OF THE MASS TRANSFER PROPERTIES OF SALINE WATER SYSTEMS

J. L. RICHARDSON, R. J. GETZ
D. L. PETERS

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INTERIOR-OFFICE OF SALINE WATER

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NG 31 1 FIELD 12A,20J

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

ANALYSIS OF CONTRIBUTIONS TO CHEMICAL BOND ENERGIES

J. W. RICHARDSON

7/65- 6/66

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NG 34 1 FIELD 7C, 7A, 7D

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STABILIZED CARBONIUM IONS OF BICYCLIC SYSTEMS

H. C. BROWN

7/65- 6/66

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NG 38 1 FIELD 7C, 7D,20M, 7B

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STUDY OF MIXED LIGAND COMPLEXES OF TRANSITION METALS

D. W. MARGERUM

6/65- 5/66

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PX 331 FIELD 7C, 7D,20J, 7B

MUNDELEIN COLLEGE, UNDERGRADUATE SCHOOL, ILLINOIS

FOR A STUDY OF METAL COMPLEXES

M. MARINA

11/65-10/66

AMERICAN ASSOC FOR ADVAN OF SCIENCE

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ZQF 284887 1 FIELD 7C, 7D

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PREPARATION OF SUBSTITUTED FLUORENONES

C. J. CHEER

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DOD-AIR FORCE

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ZQF 284909 1 FIELD 7C, 7D, 7A

USAF, AF ACADEMY, ACADEMY, COLORADO

KINETICS OF THE GLUCONIC ACID - G LUCONOLACTONE SYSTEM

L. A. KING

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ZQF 284913 FIELD 7C, 7D,20J, 7B

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DETERMINATION OF CARBON 13- HYDROGEN COUPLING CONSTANTS IN ORGANOMETALLIC COMPOUNDS

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ZUG 143 2 FIELD 7D, 7B

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FLUORINE RECOVERY FROM LOW-GRADE WASTE SOURCES

L. H. BANNING, H. O. BUTLER, P. C. GOOD

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INTERIOR-BUREAU OF MINES

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ZUG 156 2 FIELD 7D,20M, 7B

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PHYSICAL CHEMISTRY (A) RARE AND REFRACTORY METAL HALIDES

M. J. FERRANTE, A. ADAMS, F. E. BLOCK S. D. HILL, J. T. MAY, D. W. RICHARDSON

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ZUG 157 2 FIELD 7D

USDI, BUR MINES, ALBANY, OREGON

ANALYTICAL RESEARCH - APPLICATION OF ISOTOPIC DILUTION ANALYSIS

D. M. MORTIMORE, P. E. NIEBUHR

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INTERIOR-BUREAU OF MINES

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ZUG 323 2 FIELD 20M, 7A, 9+,20C

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

ELECTROSTATIC PRECIPITATOR

J. H. FABER, J. +. FABER, C. C. SHALE

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INTERIOR-BUREAU OF MINES

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ZUG 369 2 FIELD 7D,21D, 7A, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

KINETICS OF THE REACTIONS OF CARBON

S. ERGUN, M. BERMAN, M. MENTSER

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ZUG 389 2 FIELD 7A, 7D, 7B

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REMOVAL OF SULFUR OXIDES FROM FLUE GAS

J. H. FIELD, D. BIENSTOCK

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ZUG 395 2 FIELD 7C, 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

PROCESS DEVELOPMENT STUDIES FOR HELIUM PURIFICATION

R. E. WOOD, F. W. BAER, W. J. BOONE J. D. MARSHALL

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INTERIOR-BUREAU OF MINES

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ZUG 396 2 FIELD 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

GASEOUS THERMAL DIFFUSION

R. E. WOOD, R. W. TALIAFERRO

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INTERIOR-BUREAU OF MINES

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ZUG 398 2 FIELD 7A, 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

EXPERIMENTAL DETERMINATION OF ENTHALPY FOR THE HELIUM-NITROGEN SYSTEM

R. E. BARIEAU, J. A. JACOBSEN

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INTERIOR-BUREAU OF MINES

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ZUG 399 2 FIELD 7C, 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

EXPERIMENTAL PVT DATA FOR HELIUM AND SELECTED MIXTURES

R. E. BARIEAU, T. C. BRIGGS, J. E. MILLER

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INTERIOR-BUREAU OF MINES

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ZUG 400 2 FIELD 7C, 7A, 7D,20M

USDI, BUR MINES, AMARILLO, TEXAS

SOLUBILITY OF HELIUM IN LIQUEFIED GASES

R. A. GUERECA, H. P. RICHARDSON J. D. WALKER

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ZUG 401 2 FIELD 7C, 7D, 7B

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DIFFUSION OF BINARY GAS MIXTURES

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ZUG 403 2 FIELD 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

CRITICAL EVALUATION OF PUBLISHED THERMODYNAMIC DATA FOR HELIUM

R. E. BARIEAU, B. J. DALTON

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INTERIOR-BUREAU OF MINES

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ZUG 407 2 FIELD 7D, 7B

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DEVELOPMENT PROCEDURES FOR PURIFICATION AND ANALYSIS OF ULTRAPURE HELIUM

C. L. KLINGMAN, C. A. SEITZ, A. A. SONNEK

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ZUG 408 2 FIELD 7C, 7D,20M, 7B

USDI, BUR MINES, AMARILLO, TEXAS

DETERMINATION OF VISCOSITIES OF GASES

R. A. GUERECA, H. P. RICHARDSON
L. M. WALKER

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INTERIOR-BUREAU OF MINES

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ZUG 541 1 FIELD 7C, 7A, 7D

USDI, BUR MINES, SAN FRANCISCO, CALIFORNIA

RELATIVE PERMEABILITY STUDIES OF THREE-PHASE SYSTEMS

D. C. CROWELL, G. W. DEAN

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INTERIOR-BUREAU OF MINES

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ZUG 543 1 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, BOULDER CITY, NEVADA

ACTIVE METAL REDUCTION OF CHLORIDES

D. O. BLUE, V. E. HOMME

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INTERIOR-BUREAU OF MINES

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ZUG 536 1 FIELD 7C, 7D, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

USE OF RANEY NICKEL CATALYST IN A TUBE-WALL REACTOR

D. BIENSTOCK, J. J. DEMETER, L. J. HOFER
J. F. SHULTZ

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ZUG 537 1 FIELD 7C,21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

SORPTION OF METHANE ON COAL

D. BIENSTOCK, J. J. FEENAN, L. J. HOFER
R. E. KELLY

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INTERIOR-BUREAU OF MINES

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ZUG 538 1 FIELD 7C,21D, 7D, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

CHEMICAL REACTIONS IN A CORONA DISCHARGE

D. BIENSTOCK, J. J. DEMETER, L. J. HOFER
J. F. SHULTZ

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08 EARTH SCIENCES AND OCEANOGRAPHY

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GPF 211 2 FIELD 7C, 7D, 8D, 8G

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, GEOLOGICAL SCIENCES, CALIFORNIA

FUNDAMENTAL GEOCHEMISTRY OF CRITICAL MATERIALS

R. P. SHARP

AT-04-3-427
1/65-12/65

AEC-DIVISION OF PHYSICAL RES

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GPE 386 7 1 FIELD 8D, 8G, 8C, 7B

UNIVERSITY OF MIAMI, DIVISION OF RESEARCH, MARINE LAB, FLORIDA

THE GEOCHEMISTRY OF RADIOACTIVE ELEMENTS IN THE MARINE ENVIRONMENT

F. F. KOCZY, P. S. ANTAL, S. J. NISKIN
H. G. OSTLUND

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12/64-12/65

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GQF 3354 3 FIELD 8K

OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

THEORETICAL AND FIELD STUDIES OF SEISMIC WAVES

J. W. BERG

AF-49-638-01403
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GQF 3645 1 FIELD 8F, 8K

ST. LOUIS UNIVERSITY, SCHOOL OF ENGINEERING, GEOPHYS + GEOPHYS ENGR, MISSOURI

SUPPORT OF VISITING SEISMOLOGISTS

S. J. STAUDER

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GQF 258591 4 FIELD 4A

DAN METEOROL INST, DENMARK

OPERATE VARIABLE ARE RECORDING MAGNETOGRAPH AT GODHAVN GREENLAND MAGNETIC OBSERVATORY

K. ANDERSON

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GQF 550192 4 FIELD 8K,12A, 8E,13M

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

STUDY OF GROUND MOTIONS IN A LAYERED HALF-SPACE

F. SAUER

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GSB 724 2 FIELD 8D, 8G

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PALYNOLOGICAL INVESTIGATION OF SHALES AND SANDSTONES OF UPPER MISSISSIPPIAN AND LOWER PENNSYLVANIAN AGE

L. R. WILSON

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MORPHOLOGY AND EVOLUTION OF TRILOBITA AND GRAPTOLOIDEA

H. B. WHITTINGTON

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GSB 2947 7 FIELD 8D, 8G

DUKE UNIVERSITY, GRADUATE SCHOOL, ZOOLOGY, NORTH CAROLINA

PLEISTOCENE ENVIRONMENTAL CHANGES IN EAST AFRICA

D. A. LIVINGSTONE, S. S. CAVALIERE
R. L. KENDALL

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GSP 1980 1 FIELD 8D

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SYMPOSIUM ON MAGMATIC ORE DEPOSITS

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GSP 2051 1 FIELD 7C, 7D,20M, 8D

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HIGH PRESSURE EQUILIBRIUM AND CRYSTAL CHEMICAL RELATIONSHIPS OF THE HUMITE MINERAL GROUP

E. G. EHLERS, W. R. FOSTER

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GUW 6 1 FIELD 8H, 8G

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METHODS OF INVESTIGATING GROUND-WATER RECHARGE NEAR THE MARGINS OF PLATEAU BASALTS

J. W. CROSBY, H. D. COPP, J. *. CROSBY J. F. ORSBORN

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INTERIOR-OFFICE OF WATER RESOURCES

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ZUA 687 3 FIELD 8H

USDI, GEOL SURV, DIST OF COLUMBIA

HYDROLOGY OF THE UPPER MALAD RIVER BASIN

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ZUA 701 3 FIELD 8H, 48,20D

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EVAPOTRANSPIRATION THEORY AND MANAGEMENT

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ZUA 708 3 FIELD 8F, 8H

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EFFECTS OF SEDIMENT CHARACTERISTICS ON FLUVIAL MORPHOLOGY

S. A. SCHUMM

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INTERIOR-GEOLOGICAL SURVEY

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ZUA 720 3 FIELD 8H,14B,20D

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INSTRUMENTATION FOR RESEARCH

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INTERIOR-GEOLOGICAL SURVEY

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ZUA 722 3 FIELD 8H

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HYDROLOGIC EFFECTS OF FLOOD-RETARDING STRUCTURES

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ANALYTICAL MODEL OF THE LAND PHASE OF THE HYDROLOGIC CYCLE

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INTERIOR-GEOLOGICAL SURVEY

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ZUA 731 2 FIELD 8H,20D

UNSATURATED FLOW THEORY APPLIED TO DRAINAGE AND INFILTRATION

J. RUBIN

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ZUA 743 2 FIELD 13B, 8H

USDI, GEOL SURVEY, DENVER, COLORADO

MECHANICS OF EVAPORATION AND EVAPORATION SUPPRESSION

G. E. KOBERG

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ZUA 755 2 FIELD 8H

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PERMEABILITY RESEARCH

A. I. JOHNSON

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ZUA 768 1 FIELD 13G, 8F, 8H, 8G

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EVALUATION OF VARIABLES IN ALLUVIAL CHANNEL FLOW

H. P. GUY, C. F. NORDIN

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ZUA 769 1 FIELD 8D, 8F, 8G

GEOMORPHIC STUDIES IN THE SIERRA NEVADA, CALIFORNIA

R. J. JANDA

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INTERIOR-GEOLOGICAL SURVEY

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ZUA 771 1 FIELD 8H, 8F, 8G, 8K

USDI, GEOL SURVEY, DENVER, COLORADO

BOREHOLE GEOPHYSICS AS APPLIED TO GEOHYDROLOGY

W. S. KEYS

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THE RELATION OF DRAINAGE NETWORKS AND BASIN DEVELOPMENT TO ROCK TYPE AND CLIMATE

R. F. HADLEY

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ZUA 788 1 FIELD 8D, 8F, 8H

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PALEOHYDROLOGY AND GEOMORPHOLOGY OF PRIOR RIVERS, NEW SOUTH WALES

S. A. SCHUMM

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ZUA 797 1 FIELD 8F, 8H

USDI, GEOL SURV, SACRAMENTO, CALIFORNIA

A TEST OF DYNAMIC EQUILIBRIUM ON ALLUVIAL FANS IN DEATH VALLEY

L. K. LUSTIG

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ZUG 75 2 FIELD 8F, 8G, 8D

USDI, BUR MINES, SPOKANE, WASHINGTON

SUPPORT LOAD PREDICTION -- GROUND MOVEMENT INTERPRETATION

G. G. WADDELL, M. S. OUDENHOVEN

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ZUG 77 2 FIELD 8G, 8D

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SUPPORT LOAD PREDICTION - LITHOSTATIC PRESSURE

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G. G. WADDELL

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INTERIOR-BUREAU OF MINES

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ZUG 78 2 FIELD 8D, 8G

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ROCK BURST STUDIES

G. G. WADDELL

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ZUG 79 2 FIELD 8D,11B,12A,13M

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PRECAST CONCRETE MINE SUPPORTS

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ZUG 80 2 FIELD 8D,11B,11G,11F

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ZUG 90 2 FIELD 11G,10B

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ZUG 92 2 FIELD 8D,20L,20K

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ZUG 94 2 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - IN SITU OPEN-PIT STRESS ANALYSIS

D. W. WISECARVER, S. UTTER
J. B. WILLIAMS

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ZUG 97 2 FIELD 8G, 8D, 5A

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MINING RESEARCH - PHYSICS OF EARTH STRUCTURES

J. R. HOSKINS, F. HORINO, L. J. MARKOS
T. MORGAN, D. W. SKEELS

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ZUG 98 2 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - ROCK MECHANICS RESEARCH IN BLOCK-CAVING MINING

G. H. JOHNSON, D. M. ROPCHAN

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INTERIOR-BUREAU OF MINES

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ZUG 99 2 FIELD 8G, 8D, 7B

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MINING RESEARCH - ROCK MECHANICS RESEARCH IN LONGWALL MINING

W. L. DARE, W. R. SHARP

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INTERIOR-BUREAU OF MINES

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ZUG 100 2 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - ROCK MECHANICS RESEARCH IN PILLAR MINING

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INTERIOR-BUREAU OF MINES

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ZUG 101 2 FIELD 8G, 8D, 5A

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MINING RESEARCH - INSTRUMENTATION

R. H. MERRILL

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INTERIOR-BUREAU OF MINES

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ZUG 102 2 FIELD 8G, 8D, 7B

USDI, BUR MINES, DENVER, COLORADO

MINING RESEARCH - DEFORMATIONS IN ROCKS LOADED BEYOND THE ELASTIC LIMIT

R. T. BECKMAN

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INTERIOR-BUREAU OF MINES

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ZUG 111 2 FIELD 8G, 8D, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

FUNDAMENTAL ROCK PHYSICS STUDIES

J. R. MCWILLIAMS, T. R. BUR, P. PEMRICK
R. E. THILL, R. J. WILLARD

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INTERIOR-BUREAU OF MINES

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ZUG 112 2 FIELD 8G, 8D, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

INVESTIGATION OF ANISOTROPISM ON MINE ROCK

J. R. MCWILLIAMS, P. PEMRICK, R. E. THILL
R. J. WILLARD

INT-BM-4143-2
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INTERIOR-BUREAU OF MINES

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ZUG 114 2 FIELD 8K, 8G, 8D, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

BLASTING MODEL STUDIES

D. E. FOGELSON, D. V. DANDREA
R. L. FISCHER

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INTERIOR-BUREAU OF MINES

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ZUG 115 2 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

EFFECTS OF GEOLOGIC STRUCTURE ON BLASTING

D. E. FOGELSON

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INTERIOR-BUREAU OF MINES

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ZUG 116 2 FIELD 8K, 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

SEISMIC EFFECTS OF UNDERGROUND BLASTING

D. E. FOGELSON, J. J. OLSON

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INTERIOR-BUREAU OF MINES

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ZUG 117 2 FIELD 8D, 8G, 5A

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK FRAGMENTATION BY THERMAL MEANS

R. L. MAROVELLI, T. CHEN, R. E. GRIFFIN
B. J. MITCHELL, K. F. VEITH

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ZUG 118 2 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK FRAGMENTATION BY DIELECTRIC AND INDUCTION HEATING

R. L. MAROVELLI, R. E. GRIFFIN, W. KNOX

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INTERIOR-BUREAU OF MINES

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ZUG 119 2 FIELD 7D, 7C, 8D, 8G

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

EFFECT OF CHEMICAL ADDITIVES ON ROCK FRAGMENTATION

D. TERICHOW, W. H. ENGELMANN, T. E. FINCH

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INTERIOR-BUREAU OF MINES

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ZUG 120 2 FIELD 8G, 8D, 8+, 9+

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

ROCK FRAGMENTATION BY ELECTROHYDRAULIC MEANS

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INTERIOR-BUREAU OF MINES

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ZUG 121 2 FIELD 8G, 8D

USDI, BUR MINES, MINNEAPOLIS, MINNESOTA

FUNDAMENTAL DRILLING RESEARCH

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INTERIOR-BUREAU OF MINES

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ZUG 123 2 FIELD 8D, 8H, 8G

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FUNDAMENTAL MINE HYDROLOGY STUDIES

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ZUG 126 2 FIELD 8D, 8K, 8G, 5A

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ZUG 128 2 FIELD 8K, 8D, 5A,20A

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ZUG 130 2 FIELD 8G, 8D

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ROCK MECHANICS OF EVAPORITE DEPOSITS

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ZUG 131 2 FIELD 8G, 8D

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ZUG 154 2 FIELD 8D, 8G,11G,11F

USDI, BUR MINES, ALBANY, OREGON

GAMMA RADIATION (B) EFFECT ON PHYSICAL PROPERTIES OF MINERALS

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ZUG 221 2 FIELD 7D, 8N, 8G,11G

USDI, BUR MINES, ROLLA, MISSOURI

CHARACTERISTICS OF FEEBLY MAGNETIC MINERALS

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ZUG 297 2 FIELD 8D, 8H

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ACID MINE DRAINAGE - MINE SEALING

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ZUG 428 2 FIELD 8D, 5A,20H

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MINE DUST METER

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ZUG 542 1 FIELD 8D

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13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

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PRESSURIZED INFLATABLE AND FILAMENT-WOUND STRUCTURES

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FLAME CHARACTERISTICS CAUSING AIR POLLUTION

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PARTICIPATION OF PROFESSIONAL PERSONNEL IN QUALITATIVE ASSURANCE OF WAR GAMING INSTALLATION

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GQF 207572 FIELD 20M,20F,20D,20L

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

PRESSURE EFFECTS ON COMPOUND SEMICONDUCTORS

D. LANGER

/65- /

DOD-AIR FORCE

.....

GQF 258420 FIELD 20L, 7B

GROWTH OF LARGE SINGLE XTLS OF SIC OF HI-PURITY + PERFECTION BY THE TRAVELING SOLVENT METHOD

. NONE

AF-19-628-04384
/65- /

DOD-AIR FORCE

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GQF 258961 FIELD 5A,20I

CONDUCT A SYMPOSIUM ON THE PLASMA SHEATH

H. K. MOORE

AF-19-628-05055
/65- /

DOD-AIR FORCE

.....

GQF 259089 1 FIELD 20M, 9+,20J, 5A

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, PHYSICS, ILLINOIS

INVESTIGATION OF INTERACTION PROCESSES AND OSCILLATIONS IN LOW TEMPERATURE GASEOUS PLASMAS

L. GOLDSTEIN

AF-19-628-03307
/65- /

DOD-AIR FORCE

.....

GQF 259913 FIELD 9+,20J,20L, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

THEORET + EXPER STUDY OF P-N JUNCTION PROPERTIES OF 3-5 COMPOUNDS AND COMPOUND MIXTURES

N. HOLONYAK

AF-19-628-04337
/65- /

DOD-AIR FORCE

.....

GQF 284699 1 FIELD 11F,11G,20L, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MIN METAL + PETROL ENG, ILLINOIS

ANELASTIC MEASUREMENTS OF POINT DEFECTS

C. A. WERT

AF-33-615-01695
/65- /

DOD-AIR FORCE

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GQF 420566 FIELD 20D,10B

ILLINOIS INDIV. GRAN, ILLINOIS

THE EFFECT OF MASS DIFFUSION ON THE SIMILARITY PARAMETER

J. L. LOTH

AF-40-600-1118
/65- /

DOD-AIR FORCE

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GQN 544095 5 FIELD 20L,20K

WEDGE BEAM STUDIES

D. J. BUTLER, J. M. GARRELTS

NBY24967
/65- /

DOD-NAVY

.....

GQQ 595074 4 FIELD 11F,11G

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, ILLINOIS

DIRECT OBSERVATION OF LATTICE IMPERFECTIONS AND THEIR RELATION TO MECHANICAL AND PHYSICAL PROPERTIES

M. MESHII

SD-67
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

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GQQ 595270 FIELD 20L, 7B

DE HAAS-VAN ALPHEN EFFECT STUDIES

J. R. ANDERSON, S. S. LANE

SD-101
/65- /

DEFENSE-ADVANCED RES PROJECTS AGENCY

GSE 681 FIELD 11G

UNIV OF PUERTO RICO, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, PUERTO RICO

MECHANICS OF FRACTURE

P. W. OSBORNE

NSF-GK-555
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

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GSM 535 1 FIELD 12A,13M,20L

BROWN UNIVERSITY, GRADUATE SCHOOL, APPLIED MATHEMATICS, RHODE ISLAND

VISCOELASTICITY AND ELASTICITY THEORY

M. E. GURTIN

NSF-GP-3898
1/66- 1/67

NSF-MATHEMATICAL SCIENCES DIVISION

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GSP 891 3 FIELD 5A,20H, 7D,20J

UNIV OF WISCONSIN, GRADUATE SCHOOL, PHYSICS, WISCONSIN

ELEMENTARY PARTICLE AND NUCLEAR THEORY

A. M. BINCER, C. J. GOEBEL, K. W. MCVOY

NSF-GP-3637
2/66-10/66

NSF-PHYSICAL SCIENCES DIVISION

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NG 36 1 FIELD 7C, 7D,11G,20J

PURDUE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, INDIANA

LOW-LEVEL FISSION STUDIES IN PLASTIC FOILS

J. W. COBBLE

7/65- 6/66

PURDUE UNIVERSITY

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ZQA 30 FIELD 20M,11G,11D,20L

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

COUPLE STRESS THERMOELASTICITY

M. SADOWSKY

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

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ZQF 260012 FIELD 20M,20L, 7B

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

PHYSICS AND CHEMISTRY OF CRYSTAL GROWTH

C. S. SAHAGIAN

/65- /

DOD-AIR FORCE

ZQF 260037 FIELD 20J,20F,20L

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

FAR INFRARED INTERACTIONS WITH SOLIDS

E. LOEWENSTEIN

/65- /

DOD-AIR FORCE

ZQF 284712 FIELD 11F,11G

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO

MECHANICAL PROPERTIES UNDER TRANSIENT TEMPERATURES

J. A. HERZOG

/65- /

DOD-AIR FORCE

ZQF 284785 4 FIELD 20+, 9+,20H,20I

USAF, ARNOLD AFS, TENNESSEE

STUDY OF MEASUREMENT OF GAS DENSITY BY RADIATION SCATTERING

J. W. CUNNINGHAM

AF-40-600-01000
/65- /

DOD-AIR FORCE

ZQF 284813 1 FIELD 12A,20H,20I

USAF, AF ACADEMY, ACADEMY, COLORADO

INVESTIGATION OF EXTREMELY FAST HEAT-TRANSFER PROBLEMS AND THE HEAT-TRANSFER STRUCTURE OF A PLANE SHOCK WAVE

C. F. STEBBINS

/65- /

DOD-AIR FORCE

ZQF 284861 1 FIELD 20J,20I, 7B

USAF, ARNOLD AFS, TENNESSEE

SPECTROSCOPIC DIAGNOSTICS OF PLASMAS

W. K. MCGREGOR

AF-40-600-01000
/65- /

DOD-AIR FORCE

ZQF 284884 FIELD 20I,20L

USAF, AF ACADEMY, ACADEMY, COLORADO

SHOCK WAVE ATTENUATION IN THE DRIVER OF THE 17 INCH SHOCK TUBE

C. F. STEBBINS

/65- /

DOD-AIR FORCE

ZQF 475502 2 FIELD 20M,12A,13M,20D

USAF, OAR, ARL, WRIGHT-PATT-CHEM RES, OHIO

EQUILIBRIUM AND NON-EQUILIBRIUM EFFECTS OF HIGH TEMPERATURE AIR EXPANSIONS

D. ZONARS

/65- /

DOD-AIR FORCE

ZUA 775 1 FIELD 13G,20D

USDI, GEOL SURVEY, FORT COLLINS, COLORADO

MECHANICS OF FLOW STRUCTURE AND FLUID RESISTANCE

E. V. RICHARDSON

RMA-103-F
/66- /

INTERIOR-GEOLOGICAL SURVEY

****

ZUG 260 2 FIELD 20M, 7B

USDI, BUR MINES, TUSCALOOSA, ALABAMA

THERMODYNAMIC RESEARCH

A. R. TAYLOR, T. E. GARDNER, D. F. SMITH

INT-BM-4166-10
/66- /

INTERIOR-BUREAU OF MINES

21 PROPULSION AND FUELS

****

GQF 3605 3 FIELD 21B,21D, 7A, 7D

INST NATL DE TECH AERO, SPAIN, SPAIN

DIFFUSION FLAMES AND SUPERSONIC COMBUSTION

I. DARIVA

AF-EOAR-0069-65
/65- /

DOD-AIR FORCE

****

GQF 4490 FIELD 7C,21B,21I, 7D

UNIVERSITY OF DELAWARE, GRADUATE SCHOOL, CHEMISTRY, DELAWARE

COMBUSTION CHARACTERISTICS OF CRYSTALLINE OXIDIZERS

H. C. BEACHELL

AF-AFOSR-0922-65
/65- /

DOD-AIR FORCE

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GQF 6832 1 FIELD 21B, 7D,12A, 9C

UNIV OF NOTRE DAME, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, INDIANA

UNSTABLE FLAME PROPAGATION

J. F. WEHNER

AF-AFOSR-0576-64
/65- /

DOD-AIR FORCE

****

YIL 245 1 FIELD 7D,21D, 7A, 8D

STATE, GEOL SURV URBNA, ILLINOIS

MICROPETROGRAPHIC, MICROPHYSICAL AND CHEMICAL EVALUATION OF THE CARBONIZATION CHARACTERISTICS OF THE PRINCIPAL COAL CONSTITUENTS

J. A. HARRISON, C. E. MARSHALL

/65- /

STATE-ILLINOIS

ZUG 2 2 FIELD 21D,20M, 7B

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

THERMODYNAMIC PROPERTIES OF SULFUR COMPOUNDS FOUND IN PETROLEUM

D. R. DOUSLIN, J. S. BALL, H. L. FINKE
W. D. GOOD, G. B. GUTHRIE
I. A. HOSSENLOPP, J. F. MESSERLY

INT-BM-813-712
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 3 2 FIELD 7C, 7D,21D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

SEPARATION AND IDENTIFICATION OF SULFUR COMPOUNDS IN PETROLEUM

H. T. RALL, H. J. COLEMAN, R. L. HOPKINS
H. *. RALL, C. J. THOMPSON

INT-BM-0713
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 7 2 FIELD 21D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

CHARACTERISTICS OF PETROLEUM FUELS, 1964

C. M. MCKINNEY, O. C. BLADE
C. *. MCKINNEY

INT-BM-1142
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 8 2 FIELD 7C, 7D,21D, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FUNDAMENTAL STUDIES ON THE STRUCTURE AND CHEMISTRY OF COAL

I. WENDER, S. FRIEDMAN

INT-BM-1189
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 9 2 FIELD 7D,21D, 7B

USDI, BUR MINES, LARAMIE, WYOMING

NITROGEN COMPOUNDS IN PETROLEUM

W. E. HAINES, C. F. BRANDENBURG
G. U. DINNEEN, W. J. LANUM, D. R. LATHAM
J. C. MORRIS, I. OKUNO

INT-BM-1600C
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 10 2 FIELD 20M,20J, 7B

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

THERMODYNAMIC PROPERTIES OF NITROGEN COMPOUNDS FOUND IN PETROLEUM

D. R. DOUSLIN, J. S. BALL, H. L. FINKE
W. D. GOOD, G. B. GUTHRIE
I. A. HOSSENLOPP, J. F. MESSERLY

INT-BM-813-1217
/66- /

INTERIOR-BUREAU OF MINES

ZUG 12 3 FIELD 8D, 8G

USDI, BUR MINES, LARAMIE, WYOMING

OIL-SHALE AND SHALE-OIL RESEARCH - C HARACTERISTICS OF OIL SHALES

K. E. STANFIELD, D. R. JOHNSON
J. W. SMITH, H. M. THORNE, L. G. TRUDELL
N. B. YOUNG

INT-BM-1593-A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 15 2 FIELD 8D,12A, 5C, 8E

USDI, BUR MINES, SAN FRANCISCO, CALIFORNIA

RELATIONSHIP BETWEEN PRODUCTIVE CAPACITY AND RECOVERY OF OIL

G. B. SHEA, R. V. HIGGINS
H. J. LECHTENBERG

INT-BM-13-1598-C
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 16 2 FIELD 8D,12A, 5C

USDI, BUR MINES, SAN FRANCISCO, CALIFORNIA

COMPUTER ANALYSIS OF OIL AND GAS RECOVERY PERFORMANCES

R. V. HIGGINS, D. W. BOLEY
A. J. LEIGHTON

INT-BM-13-1598-A
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 27 2 FIELD 21D, 7D, 7A

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

APPARATUS TO MEASURE COMPRESSIBILITY OF TWO-PHASE FLUIDS

C. K. EILERTS, N. L. POTTS

INT-BM-4922
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 29 2 FIELD 7C,21D, 7A, 8D

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

GAS STORAGE AND/OR CYCLING IN OIL RESERVOIRS

A. B. COOK, A. F. BAYAZEED, A. *. COOK
F. S. JOHNSON, G. B. SPENCER

INT-BM-3727
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 37 2 FIELD 7D,21D,20H

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

THE USE OF NEUTRON ACTIVATION IN PETROLEUM RESEARCH

F. E. ARMSTONG, C. E. ARTHUR

INT-BM-3738
/66- /

INTERIOR-BUREAU OF MINES

ZUG 39 2 FIELD 8K, 8D,18A

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

STIMULATION OF OIL AND GAS PRODUCTION WITH NUCLEAR EXPLOSIVES

C. H. ATKINSON, A. D. BROWNLOW
J. W. DAVIS, D. C. WARD

INT-BM-3183
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 44 3 FIELD 21D,20M,20J, 5A

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

THERMODYNAMIC PROPERTIES OF COMPOUNDS RELATED TO PETROLEUM

D. R. DOUSLIN, J. S. BALL, H. L. FINKE
B. GAMMON, W. D. GOOD, G. B. GUTHRIE
R. H. HARRISON

INT-BM-13-1608-17
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 46 2 FIELD 7C,21D, 8D, 8G

USDI, BUR MINES, DIST OF COLUMBIA

A CHEMICAL-PHYSICAL APPROACH TO FINDING AND PRODUCING PETROLEUM

H. M. SMITH, H. *. SMITH

INT-BM-4205
/66- /

INTERIOR-BUREAU OF MINES

.....

ZUG 318 3 FIELD 7D,21D, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

SPECTROCHEMICAL ANALYSIS OF COAL ASH

F. D. LAMB, W. J. CAMPBELL
M. J. PETERSON

INT-BM-111238-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 319 3 FIELD 21D, 7D, 8D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

PREPARATION CHARACTERISTICS OF COKING COALS

W. H. OPPELT, A. W. DEURBROUCK

INT-BM-4179-1
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 324 2 FIELD 21D, 7A, 7D,10B

USDI, BUR MINES, DIST OF COLUMBIA

DIELECTRIC SEPARATION OF COAL ASH

J. H. FABER, J. *. FABER, J. A. PHILLIPS
C. C. SHALE

INT-BM-11-4182-12(A)
/66- /

INTERIOR-BUREAU OF MINES

ZUG 326 2 FIELD 21D, 7A

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

FLY ASH UTILIZATION

J. H. FABER, L. M. ADAMS, J. P. CAPP
J. *. FABER

INT-BM-11-4182-11(B)
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 327 2 FIELD 13F,21D, 7D,20D

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

PNEUMATIC TRANSPORT OF PULVERIZED COAL

J. H. FABER, J. *. FABER, . KANE

INT-BM-11-4182-5(A)
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 330 2 FIELD 21D, 7D

USDI, BUR MINES, DIST OF COLUMBIA

UNDERGROUND GASIFICATION OF COAL

J. H. FABER, J. P. CAPP, J. *. FABER

INT-BM-11-4182-11
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 332 2 FIELD 21D, 7D

USDI, BUR MINES, MORGANTOWN, WEST VIRGINIA

PROCESS EVALUATION

S. KATELL, W. T. ABEL, P. R. JONES
S. *. KATELL, W. C. MOREL, K. D. PLANTS
P. WELLMAN

INT-BM-11-4182-7
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 338 3 FIELD 8D

USDI, BUR MINES, TUSCALOOSA, ALABAMA

COAL RESEARCH AND DEVELOPMENT

F. J. CSERVENYAK

INT-BM-4184
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 339 2 FIELD 21B,21D, 7D,10B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

THE EFFECT OF PRESSURE ON THE COMBUSTION OF COAL IN A FIXED BED

W. H. OPPELT, R. R. GADOMSKI
C. R. MCCANN, A. A. ORNING

INT-BM-4185-25
/66- /

INTERIOR-BUREAU OF MINES

ZUG 354 2 FIELD 7C,21D, 7A, 7D

DILUTE-PHASE HYDROGASIFICATION OF COAL TO HIGH-BTU GAS

R. W. HITESHUE, S. FRIEDMAN
H. H. GINSBERG, P. S. LEWIS, J. A. MIMA

INT-BM-11114121-1
/ 6-6 /

INTERIOR-BUREAU OF MINES

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ZUG 359 2 FIELD 7C,21D, 7A,20M

REACTIONS OF COAL IN HIGH-TEMPERATURE PLASMAS

R. W. HITESHUE, R. D. GRAVES, W. KAWA
J. E. ZEILINGER

INT-BM-11114121-2
/ 6-6 /

INTERIOR-BUREAU OF MINES

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ZUG 366 2 FIELD 21D, 8D, 8G,12A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

OPTICAL PROPERTIES OF COALS AND RELATED MATERIALS

S. ERGUN, M. BERMAN, J. T. MCCARTNEY
W. VANBUREN

INT-BM-4185-3
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 367 2 FIELD 7D,21D,20J, 5A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

ULTRAFINE STRUCTURE OF COAL BY ELECTRON MICROSCOPY

S. ERGUN, J. T. MCCARTNEY

INT-BM-4185-4
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 371 2 FIELD 7C,21D, 7A, 7D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

DEHYDROGENATION OF COAL

I. WENDER, R. RAYMOND, L. REGGEL

INT-BM-4185-8B
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 375 2 FIELD 7C, 7D,21D, 7A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

NOVEL REACTIONS OF COAL

I. WENDER, S. FRIEDMAN, M. L. KAUFMAN

INT-BM-4185-8D
/66- /

INTERIOR-BUREAU OF MINES

ZUG 394 1 FIELD 7C,21D, 7D, 7B

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

FUNDAMENTALS OF FUEL STABILITY

C. C. WARD, C. S. ALLBRIGHT, J. S. BALL
F. G. SCHWARTZ, M. L. WHISMAN

INT-BM-4238
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 394 2 FIELD 7C,21D, 7D, 7B

USDI, BUR MINES, BARTLESVILLE, OKLAHOMA

FUNDAMENTALS OF FUEL STABILITY

C. C. WARD, C. S. ALLBRIGHT
F. G. SCHWARTZ

INT-BM-6-4150-1100
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 421 2 FIELD 21D,13H

USDI, BUR MINES, SCHUYLKILL, PENNSYLVANIA

ANTHRACITE AS AN AGGLOMERATE METALLURGICAL FUEL

R. E. MCKEEVER

INT-BM-4257-A
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 494 1 FIELD 19D,21B, 7A, 7B

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FIRE AND EXPLOSION HAZARDS OF FLIGHT VEHICLE COMBUSTIBLES

M. G. ZABETAKIS, M. H. HAY
E. L. LITCHFIELD, G. H. MARTINDILL
H. E. PERLEE

INT-BM-3757
/65- /

INTERIOR-BUREAU OF MINES

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ZUG 534 1 FIELD 7C,21B,21D, 7D

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

FORMATION OF OXIDES OF NITROGEN IN COAL COMBUSTION

D. BIENSTOCK, R. L. AMSLER

INT-BM-4185-29
/66- /

INTERIOR-BUREAU OF MINES

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ZUG 535 1 FIELD 7D,21B,21D, 7A

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

HIGH-TEMPERATURE COAL-COMBUSTION STUDIES

D. BIENSTOCK

INT-BM-4185-10
/66- /

INTERIOR-BUREAU OF MINES

D, 7B
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7A, 7B
21D, 7D
COAL
21D, 7A
UDIES

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TECHNICAL ABSTRACT BULLETIN

Field 1-AERONAUTICS

1/1. AERODYNAMICS

AD-631 872 **See Fld. 21/5**

AD-632 391 **See Fld. 1/3**

1/2. AERONAUTICS

AD-632 469 Fld. 1/2
CFSTI Prices: HC $4.00 MF $0.75
RAND CORP SANTA MONICA CALIF
TECHNICAL-ECONOMIC PROBLEMS OF AIR TRANSPORT,
by B. M. Parakhonskii. Apr 66, 103p. Rept. no. LT-64-72,
TT 66-61222

Unclassified report

Trans. of mono. Tekhniko-Ekonomicheskie Problemy Vozdushnogo Transporta, Moscow 1961.

Descriptors: (*Air transportation, USSR), (*Aeronautics, USSR), (*Civil aviation, USSR), Aircraft, Air traffic, Terminal flight facilities, Economics, Transportation, State-of-the-art reviews

Contents: Technical - operating aspects of air transport; The role of air transport in a single transportation network of the USSR: Passenger service, mail and freight hauls; Problems of air transport development in the USSR: The development of air hauls, passenger flows along air routes, possible classification criteria for airlines, distribution of airports and an air communication network, the development of the technical means of air transport; Principles of measuring air transport's economic effectiveness.

AD-632 029 **See Fld. 1/4**

AD-632 520 **See Fld. 20/4**

AD-632 572 **See Fld. 1/3**

1/3. AIRCRAFT

AD-632 123 Fld. 1/3, 20/11, 11/6
CFSTI Prices: HC $6.60 MF $0.75
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF
A METHOD FOR ESTIMATING THE FATIGUE LIFE OF 7075-T6 ALUMINUM ALLOY AIRCRAFT STRUCTURES.
Final rept.,
by Clarence R. Smith. Dec 65, 70p. Contract N156-41307, Proj. PA-1-23-60,
NAEC ASL-1096

Unclassified report

Descriptors: (*Aluminum alloys, *Fatigue (Mechanics)), (*Airframes, Aluminum alloys), (*Metallography, Aluminum alloys), Structures, Life expectancy, Test methods, Strain (Mechanics), Loading (Mechanics), Stresses, Fracture (Mechanics), Failure (Mechanics), Mathematical prediction, Aviation safety

The purpose of this investigation was to assess the validity of the 'Smith Cumulative Damage' hypothesis for 7075-T6 aluminum alloy specimens and structures. It was found that the results of a single-amplitude test (at short life) can be used to estimate the stress at the point of failure, including residual stress. This permits using S-N data for axially loaded unnotched specimens to predict spectrum life. Excellent agreement was found between calculated and experimental lives of full-scale structures; however, test lives of small specimens were consistantly shorter than predicted. (Author)

AD-632 128 Fld. 1/3
CFSTI Prices: HC $1.60 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
APPLICATION OF A PARTICULAR SOLUTION OF THE EULER-POISSON EQUATION TO TERRAIN-FOLLOWING AND FORMATION-FLIGHT AIRCRAFT SUBSYSTEMS.
Technical rept.,
by Norman K. Shupe. Apr 66, 19p. Rept. no. ECOM-2691,
Proj. DA-1E1-34101-D235-01-00,

Unclassified report

Descriptors: (*Flight control systems, Optimization), Terrain, Flight paths, Aircraft

This report deals with the automatic control of an aircraft in a terrain-following mode of operation. The primary concern of the report is the generation of an analytical control law which takes into account the main constraints of aircraft performance, those of maximum lift acceleration and a maximum climbdive angle capability. The approach taken is to solve the Euler-Poisson equation for a particular, but realistic, definition of an 'optimum' flight trajectory. The resulting solution of the Euler-Poisson equation contains a shaping parameter which allows a good bit of freedom in shaping the basic flight path trajectory to the characteristics of a particular aircraft. The control law is such that errors in prediction of present and future aircraft dynamic performance are manifested to a minimal extent, in the accuracy of present command to the aircraft. An application of the developed control law to the analog computer simulation of an aircraft formation flight subsystem is presented as an appendix. (Author)

AD-632 302 Fld. 1/3, 21/5, 13/10
CFSTI Prices: HC $17.10 MF $1.00
GARRETT CORP PHOENIX ARIZ AIRESEARCH MFG DIV
GEM PROPULSION SYSTEM STUDY.
Progress rept.
21 Jun 60, 155p. Rept. no. AP-5017-R,
Contract Nonr-3024 (00),

Unclassified report

See also AD-604 741.

Descriptors: (*Ground effect machines, Propulsion), (*Ducted fans, Ground effect machines), Design, Gas turbines, Ducts, Aerodynamic characteristics, Velocity, Wings, Propellers (Marine), Effectiveness, Aerodynamic configurations

Preliminary design concepts have been used to establish reference designs to cover a large range of vehicle sizes. The reference designs are to be utilized to study the 'hardware' design problems. Three reference designs are established. Each design was chosen to fall within certain classifications of size: 20<or=D sub o <or=50, 50<or=D sub o <or=200, and 200<or=D sub o <or=1000. It must be stressed that the reference designs do not necessarily represent the optimum design in each range. Three purposes are accomplished through use of reference designs: A propulsion system design method is established. The use of the design techniques are illustrated. Comparisons can be made between various propulsion system compounds.

AD-632 391 Fld. 1/3, 1/1, 13/6
CFSTI Prices: HC $4.60 MF $0.50
GARRETT CORP PHOENIX ARIZ AIRESEARCH MFG DIV
GEM STABILITY AND QUALITY CONTROL STUDY.
Progress rept.,
by B. W. Anderson. 11 Nov 60, 47p. Rept. no. AP-5025-R,PR-2
Contract Nonr-3173 (00),

Unclassified report

Descriptors: (*Ground effect machines, *Equations of motion), Stability, Control, Control systems, Aerodynamic characteristics, Propulsion, Force (Mechanics), Motion

Four main steps were taken to define control and stability requirements. The first step was to write general equations of vehicle motion. This was done on the basis of transient perturbations relative to steady-state motion. The second step was to evaluate the various forces. Forces acting on the Ground Effect Machine (GEM) are air cushion pressure, aerodynamic forces, propulsion forces, and control forces. Lift and moment due to air cushion pressure was calculated on the Bendix G-15 digital computer. Aerodynamic lift, drag, and center of pressure were obtained from known results for symmetrical bodies. Propulsion and control systems which use the air cushion pressures are being analyzed on the digital computer because of the intimate interactions within the air cushion and the nonlinear nature of the problem. The forces produced by controls will be verified in the model test program. The third step is to solve the general equations of motion using the forces obtained in step two. The fourth step is to determine the desired control characteristics. This will be done by first linearizing the equations of motion and determining a suitable control transfer function from linear stability considerations and then simulating this control function on the analog computer with the more complete representation of vehicle characteristics. (Author)

AD-632 398 Fld. 1/3, 20/4
CFSTI Prices: HC $1.00 MF $0.50
DAVIDSON LAB STEVENS INST OF TECH HOBOKEN N J
THE EFFECT OF CAMBER ON THE NEAR-SURFACE FORCE, CENTER-OF-PRESSURE, AND VERTICAL STABILITY CHARACTERISTICS OF A RECTANGULAR-PLANFORM HYDROSKI.
Letter rept.,
by R. L. Van Dyck. Dec 65, 23p. Rept. no. R-1102,
Contract N600(19)62908, Proj. DL-2953, Task 1,

Unclassified report

Descriptors: (*Camber, Hydro-skis), (*Hydro-skis, Seaplanes), Force (Mechanics), Pressure, Stability, Lift, Drag, Surfaces, Velocity, Hydrodynamics

The hydrodynamic force characteristics of a cambered rectangular planform, 15-degree deadrise hydroski are shown to be similar to those of an equivalent uncambered ski with the exceptions that, for a cambered ski: (1) the zero lift angle is shifted to lower angle of attack for the same wetted area and aspect ratio and (2) the center of pressure is shifted aft. Comparison at the same draft -- or wetted area and aspect ratio -- show similar submerged lift-drag ratios for both cambered and uncambered skis in the range of trim angles tested. The region of pre-emergence vertical instability is shown to be caused by the loss in lift as a hydroski runs in the range of drafts just below the planing boundary down to drafts sufficiently deep to preclude ventilation and surface effects, where a ski

can run stable fully-wetted with approximately double the planing lift. Increased forward acceleration at unporting was found to shift the pre -emergence instability range to higher speeds and to reduce the time interval spent in this unstable region. (Author)

AD-632 459 Fld. 1/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AERO-ELECTRONIC TECHNOLOGY DEPT
FABRICATION, INSTALLATION AND FLIGHT TESTING OF SAWMARCS AIRCRAFT STORES CONTROL SYSTEM IN AN A-4C AIRCRAFT.
Final rept.,
by H. Brown. 4 Apr 66, 21p. Rept. no. NADC-AE-6611,
Task RAV05J013/2021/F008-05-03,
Unclassified report

Descriptors: (*Attack bombers, Aircraft equipment), (*Aircraft ammunition, Control systems), Release mechanisms, Flight testing, Installation, Circuits, Aircraft guns, Instrument panels, Weapon systems, Feasibility studies

A compatible aircraft stores control system, code named SAWMARCS for Standard Aircraft Weapons Monitor and Release Control System, was fabricated and installed in an A-4C aircraft to test the feasibility of replacing present day modular controls with one integrated system. (Author)

AD-632 570 Fld. 1/3, 15/5, 13/6
CFSTI Prices: HC $1.00 MF $0.50
FIELD EMISSION CORP MCMINNVILLE OREG
PERFORMANCE TESTING OF AN AIR CUSHION VEHICLE ON THE GREENLAND ICE CAP.
Special rept.,
by Gunars Abele. Feb 66, 24p. Rept. no. SR-91,
Task DA-1V025001A13001,
Unclassified report

Descriptors: (*Ground effect machines, *Snow vehicles), (*Transportation, Greenland), (*Snow, Trafficability), Ice, Polar regions, Mobility, Aircraft, Performance (Engineering), Ground effect

During the summer of 1964, performance tests were conducted on the Greenland Ice Cap to determine and evaluate the feasibility of the air cushion vehicle concept as a transportation method in polar regions. Results from tests with the Bell Tri-Cell Plenum Air Cushion Vehicle indicated that the test vehicle can cruise over an undisturbed snow surface at speeds up to 35 mph and produce a maximum speed of 42 mph. The test vehicle was capable of ascending a 6 to 10% slope against a 15-knot wind, traveling over soft snow drifts up to 30 inches high, and crossing ditches of at least a 5-ft width. The payload capacity of the vehicle was approximately 1000 lb, not including the operator and fuel. The skirt lifting sideforce concept and the harrow disk attachment proved to be very effective for control and maneuverability of the vehicle. (Author)

AD-632 572 Fld. 1/3, 17/9, 1/2, 15/7
CFSTI Prices: HC $3.00 MF $0.75
HARRY DIAMOND LABS WASHINGTON DC
HADOPAD RADAR ACTUATOR DESIGN AND PERFORMANCE.
Technical memo.,
by John J. Roach, and Malcolm L. Wiseman. Feb 65, 92p. Rept. no. TM-66-2,
Proj. DA-1W542703D346,HDL-47100
Unclassified report

Descriptors: (*Radar, Actuators), (*Actuators, *Parachutes), (*Air drop operations, Parachute descents), Remote control systems, Radar equipment, Height finding, Drop testing, Performance (Engineering)

A low-cost radar actuator for use as a component in a delayed-opening parachute aerial-delivery system has been developed. This device is known as HADOPAD (High-Altitude Delayed-Opening Parachute Actuating Device). The device, based on radar principles, will open a main recovery parachute at either of two preset heights (1000 or 1700 ft) above the ground. The complete system utilizes a drogue-parachute stabilizing stage for free fall from high altitude followed by a main- parachute recovery stage which is initiated at low altitude by the radar actuator. Limited field testing of the radar actuator at Fort Devens, Mass. has shown the feasibility of the device as a parachute actuator, but some additional engineering and complete environmental tests are necessary before initiation of quantity production. Forty actuators were constructed by HDL during the research and development phase. (Author)

AD-632 457 **See Fld. 6/12**

AD-632 488 **See Fld. 20/4**

AD-632 492 **See Fld. 11/4**

AD-632 538 **See Fld. 11/9**

AD-632 610 **See Fld. 4/2**

1/4. AIRCRAFT FLIGHT INSTRUMENTATION

AD-632 029 Fld. 1/4, 1/2
CFSTI Prices: HC $1.00 MF $0.50
INSTRUMENT PILOT INSTRUCTOR SCHOOL RANDOLPH AFB TEX
FLIGHT DIRECTOR/FLIGHT PATH ANGLE APPLICATION TO NON-ILS APPROACH ENVIRONMENT.
Mar 66, 12p. Proj. CDG-65-1A
Unclassified report

Descriptors: (*Flight instruments, *Display systems), Flight paths, Aeronautics, Performance (Human), Velocity, All-weather aviation, Aircraft landings, Take-off, Altimeters

Four pilots flew 72 hooded approaches to determine the application of flight director techniques, flight path angle and absolute altitude information to a non -ILS approach environment. It was determined that: (1) Flight director techniques can be used in a non -ILS approach environment to increase precision and decrease pilot workload. (2) Path angle information is more meaningful to the pilot than vertical velocity for glide slope following. (3) Pitch augmented rate, the vertical component of flight path angle, is a significant improvement over barometric vertical velocity. (4) Due to variations in terrain contour, the utility of absolute altitude with current landing weather minima is limited. However, it is essential to an IFR touchdown capability. Properly presented it provides the pilot with accurate and easily interpreted rate of closure information. (Author)

AD-632 308 **See Fld. 17/7**

Field 3-ASTRONOMY AND ASTROPHYSICS

3/1. ASTRONOMY

AD-632 162 Fld. 3/1, 22/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
STRUCTURE OF THE CRATER ALPHONSUS.
Environmental research papers,
by Luciano B. Ronca. Apr 66, 6p. Rept. no. AFCRL-ERP-184,AFCRL-66-232
Proj. 8602, Task 860202,
Unclassified report

Availability: Published in Nature v209 n5019 p182 Jan 8 1966. Copies to DDC users only.

Descriptors: (*Moon, Terrain), (*Lunar probes, *Photogeology), Extraterrestrial topography, Structural geology

From examinations of Ranger IX photographs, a dextral strike-slip fault across the floor of Alphonsus is described. The central spine and peak are considered volcanic, similar to Pelean extrusions on the earth. (Author)

AD-632 203 **See Fld. 22/2**

3/2. ASTROPHYSICS

AD-631 938 Fld. 3/2, 20/10
CFSTI Prices: HC $7.85 MF $2.25
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
TABLE OF HARTREE-FOCK SELF CONSISTENT FIELD WAVE FUNCTIONS WITH EXCHANGE, SUPPLEMENT I.
Scientific rept.,
by T. K. Krueger, W. L. McDavid, and S. J. Czyzak. Jan 66, 484p. Rept. no. ARL-66-0014,
Proj. AF-7114,
Unclassified report

See also AD-614 428, AD-631 601.

Descriptors: (*Atomic spectroscopy, Astrophysics), (*Quantum mechanics, Astrophysics), (*Tables, Astrophysics), Electron transitions, Programming languages, Atomic energy levels, Wave functions

A table is presented of the Hartree-Fock wave functions for various atoms and ions mainly of astrophysical interest having atomic numbers up to 28. Also included in the table are the one-electron energy parameters and the relativistic and spin-orbit energy corrections. (Author)

AD-631 970 Fld. 3/2, 8/7
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
EXPERIMENTAL SPECTROPHOTOMETRIC COMPARISON OF THE SURFACE OF THE MOON AND CERTAIN VOLCANIC DEPOSITS.
Research translation,
by I. I. Lebedeba. Mar 66, 9p. Rept. no. T-R-588,
Contract AF 19 (628)-3880,
TT 66-61162
Unclassified report

Opyty Spektrofotometricheskogo Sopostavleniya Poverkhnosti Luny s Nekotorymi Vulkanicheskimi Pokrovami, trans. of Leningrad Univ. Uchenye Zapiski (USSR) n326 p99-102 1965.

Descriptors: (*Moon, Optical properties), (*Petrology, Optics), Extraterrestrial topography, Earth (Planet), Volcanoes, Igneous rock, Light, Reflection, Measurement, Spectrophotometers, Correlation techniques, USSR

The published data on the spectral reflectivity of the lunar maria and continents are compared to corresponding data for diverse samples of terrestrial rocks from Kamchatka and Kuril Islands. These samples were studied with a photoelectric spectrophotometer (in the region 450-590 millimicron). The spectral reflectivity curves for lapilli, volcanic sand, and brown volcanic scoriae coincide with the corresponding curves for the lunar surface in the limits of natural dispersion. Therefore, one can conclude that the presence on the moon of the pyroclastic materials of the type mentioned is possible. (Author)

AD-632 021 Fld. 3/2, 3/3
CFSTI Prices: HC $1.00 MF $0.50
TEXAS UNIV AUSTIN DEPT OF ASTRONOMY
SOME OBSERVATIONS OF INSTABILITY PHENOMENA IN GALAXIES.

Technical rept.,
by G. de Vaucouleurs. Apr 66, 12p. Rept. no. TR-1,
Contract N00014-66-C0061,
Unclassified report

Rept. on Spectroscopic and Radial Velocity Survey of Bright Galaxies.

Descriptors: (*Galaxies, Stability), Celestial mechanics, Astrophysics, Photometers, Spectroscopy

Phenomena suggestive of large-scale instability in galaxies were observed during the past 15 years at the Mt. Stromlo and McDonald Observatories. A few typical examples are described mainly from recent photometric and spectroscopic observations at McDonald Observatory. (Author)

AD-632 105 Fld. 3/2, 7/4
CFSTI Prices: HC $2.00 MF $0.50
HARVARD COLL OBSERVATORY CAMBRIDGE MASS
CONTINUOUS ULTRAVIOLET ABSORPTION BY NEUTRAL SILICON,
by John C. Rich. Apr 66, 44p. Rept. no. Scientific-10,
Contract Nonr-1866 (48) ,NSG-438
Unclassified report

Descriptors: (*Solar spectrum, Silicon), (*Silicon, Absorption spectrum), (*Ultraviolet spectroscopy, Silicon), Photochemistry, Ionization, Probability, Atomic energy levels, Excitation, Solar atmosphere

Photoionization cross sections (bound-free absorption coefficients) were measured for the 3s2 3p2 triplet-P ground state and singlet-D excited level of the neutral silicon atom. The measurements, made in absorption with the use of reflected shock techniques,yield cross sections of about 37 and 34 megabarns respectively, near the ionization limits. Theoretical quantum defect calculations give satisfactory comparisons. The next excited singlet-S level is discussed. (Author)

AD-632 131 Fld. 3/2, 17/8
CFSTI Prices: HC $2.60 MF $0.50
MANCHESTER UNIV (ENGLAND) DEPT OF ASTRONOMY
RESEARCH STUDY AND DEVELOPMENT OF 1-METRE MIRROR FOR MOON TRACKING AND PHOTOGRAPHY.
Final scientific rept.,
by Zdenek Kopal. Jan 66, 30p. Contract AF 61 (052)-400,
AFCRL 66-257
Unclassified report

Descriptors: (*Moon, Optical scanning), (*Photography, Moon), (*Telescopes, *Astronomy), Astronomical cameras, Optical equipment, Tracking, Optics, Solar systems, Scientific research

This document describes the lunar research programmes carried out with the Pic-du-Midi 1-metre telescope up to the present time; tests carried out on the optics; tests carried out to determine the stability of the mounting and the tracking accuracy of the system and planetary and other research carried out. (Author)

AD-632 158 Fld. 3/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
WINKING FILAMENTS AND PROMINENCE AND CORONAL MAGNETIC FIELDS.
Environmental research papers,
by Charles L. Hyder. 19 Oct 65, 12p. Rept. no. AFCRL-66-239,AFCRL-ERP-187
Proj. AF-7649, Task 764906,
Unclassified report

Availability: Published in Zeitschrift fur Astrophysik v63 p78-84 1966. Copies to DDC users only.

Descriptors: (*Solar disturbances, *Magnetohydrodynamics), Solar corona, Magnetic fields, Oscillation, Astrophysics

Analysis of the characteristic frequencies of oscillation (1.7 X 0.001 to 3.3 X 0.0001 cps) and of the decay constants (2.7 X 0.001 to 6.3 X 0.0001/sec) of 11 winking filaments leads of values for the radial components of the filament magnetic fields (2 < or = B sub r < or = 30 gauss) and to effective coefficients of viscosity (0.4 < or = eta < or 1.6 nanopoise) in the corona surrounding the filaments. The viscosities may be interpreted in terms of the coronal magnetic fields (B sub c) associated with the filaments. The range of values for the coronal fields is 0.09 < or = B sub c < or = 0.18 gauss. (Author)

AD-632 166 Fld. 3/2, 20/9
CFSTI Prices: HC $4.60 MF $0.50
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
SECULAR VARIATIONS IN THE MAGNETIC FIELD STRENGTH OF SUNSPOT GROUPS.
Scientific rept.,
by Truls S. Ringnes. 1965, 46p. Rept. no. Scientific-6,
Contract AF 61(052)-743,
AFCRL 66-219
Unclassified report

Astrophysica Norvegica v10 n3 p28-68 1965.

Descriptors: (*Sunspots, *Magnetic fields), Magnetohydrodynamics, Astrophysics, Solar atmosphere

The relation between area and magnetic field strength of sunspot groups, the magnetic life history of long -lived spots and frequency distribution of observed maximum field strength of sunspot groups were studied over the period 1917-1958. The secular variations which are detected are discussed and compared with the secular variations established previously in the number of sunspot groups, their areas, area distribution etc. Finally a brief account is given of the eighty-year cycle of sunspots. (Author)

AD-632 167 Fld. 3/2
CFSTI Prices: HC $1.10 MF $0.50
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
ON THE LIFETIME OF SUNSPOT GROUPS.
Scientific rept.,
by Truls S. Ringnes. 1965, 10p. Rept. no. Scientific-2,
Contract AF 61 (052)-743,
AFCRL 66-215
Unclassified report

Astrophysica Norvegica v9 n11 p97-101 1965.

Descriptors: (*Sunspots, Life expectancy), Solar disturbances, Distribution, Astrophysics, Norway

A study is made of the age-frequency distribution of sunspot groups. The analysis covers the interval 1888-1955. The results are critically compared with the quantitative deductions made by previous authors on the basis of a paper by Gnevishev. (Author)

AD-632 170 Fld. 3/2
CFSTI Prices: HC $1.60 MF $0.50
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
OPACITY PROPERTIES OF SUNSPOTS,
by Eberhart Jensen, and Per Maltby. Jan 65, 13p. Rept. no. Scientific-5,
Contract AF 61 (052)-743,
AFCRL 66-218
Unclassified report

Astrophysica Norvegica v10 n2 p17-25 1965.

Descriptors: (*Sunspots, Optical properties), Solar disturbances, Solar atmosphere, Mathematical models, Astrophysics, Norway

Three sunspot models are considered with respect to their transparency properties. The optical radius is calculated as function of the vertical optical depth. At vertical optical depth 0.7 the three spot models considered give (horizontal) optical radii equal to 130,0.7 and 0.055, respectively. It is pointed out that the vertical temperature distribution cannot be deduced from the observations of the umbra intensity as function of spot position without taking the finite size of the spot into account, unless the opacity in the spot is relatively high. Our results indicate that the umbra is about as opaque as the photosphere. Otherwise the surrounding hotter regions would be observable through the umbra when the spot is situated away from the disk centre. (Author)

AD-632 171 Fld. 3/2, 20/9
CFSTI Prices: HC $3.60 MF $0.50
OSLO UNIV (NORWAY) DEPT OF ASTROPHYSICS
RESEARCHES IN SOLAR PHYSICS DURING 1965,
by Eberhalt Jensen. 31 Jan 66, 39p. Rept. no. Scientific-11,
Contract AF 61 (052)-743,
AFCRL 65-258
Unclassified report

Descriptors: (*Solar atmosphere, Spectroscopy), (*Sunspots, Molecular spectroscopy), (*Sun, Scientific research), Solar disturbances, Plasma physics, Magnetohydrodynamics, Astronomical data, Statistical analysis, Norway

Report on work at Oslo Solar Observatory during 1965 on burst phenomena, solar spectroscopy and sunspot structure. (Author)

AD-632 209 Fld. 3/2
TEXAS UNIV AUSTIN DEPT OF ASTRONOMY
A SPECTROPHOTOMETRIC ANALYSIS OF PROCYON. I. EQUIVALENT WIDTHS AND LINE PROFILES.
Technical rept.,
by Frank N. Edmonds,Jr.. 28 Dec 64, 23p. Contract Nonr (G)-00049-64, Proj. NR-046-797,
Unclassified report

Availability: Published in Astrophysical Journal v142 n1 p278-98 July 1, 1965. Copies to DDC users only.

Descriptors: (*Stars, Line spectrum), Tables, Photographic images, Spectrophotometers, Scattering

The equivalent widths of 152 lines (22 chemical elements) and the profiles of H-alpha H-beta and Ca II K measured from high-dispersion spectrograms of the F5 IV-V subgiant Procyon are tabulated. Various limitations on the accuracy of these results are discussed, including photographic adjacency effects and scattering of light in the coude spectrograph at McDonald Observatory. (Author)

AD-632 231 Fld. 3/2
CFSTI Prices: HC $2.60 MF $0.50
RAND CORP SANTA MONICA CALIF
A COMPUTATIONAL APPROACH TO CHANDRASEKHAR'S PLANETARY PROBLEM,
by R. Bellman, H. Kagiwada, R. Kalaba, and S. Ueno. May 66, 27p. Rept. no. RM-4991-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Astrophysics, Transport properties), (*Boundary value problems, Astrophysics), Planetary atmospheres, Programming (Computers), Planets

Chandrasekhar's planetary problem is reformulated using an initial-value approach. The problem concerns the diffuse reflection of radiation from a finite atmosphere with a reflecting surface at the bottom. In the direct problem, the angular distribution of multiple-scattered radiation is computationally obtained as the solution of an initial-value problem for ordinary differential equations for S, a generalization of the Chandrasekhar scattering function for an inhomogeneous atmosphere. In

the inverse planetary problem, the properties of the atmosphere and the surface are to be estimated, given the angular distribution of scattered radiation. The quasilinearization technique for nonlinear multipoint boundary-value problems provides an effective method for obtaining a computational solution to the inverse problem. A FORTRAN program for both the direct and inverse problems is presented in the Appendix. (Author)

AD-632 345 Fld. 3/2
CFSTI Prices: HC $1.00 MF $0.50
OWENS VALLEY RADIO OBSERVATORY CALIF INST OF TECH PASADENA
THE GALACTIC SPURS AS A SINGLE FEATURE,
by G. W. Rougoor. 1966. 7p. Contract Nonr-220 (19).

Unclassified report

Descriptors: (*Galaxies, *Radio astronomy), Stars, Configuration, Extraterrestrial radio waves, Astrophysics

The spurs, visible in maps of low frequency radio emission at intermediate and high galactic latitudes, can be connected to form one single feature, passing close to the galactic poles and crossing the galactic plane under right angles. Because of its shape and its relation with the Galactic System it is unlikely that the spurs are relatively close by and that they ae remnants of supernovae. (Author)

AD-632 346 Fld. 3/2
OWENS VALLEY RADIO OBSERVATORY CALIF INST OF TECH PASADENA
THE STRUCTURE OF RADIO GALAXIES,
by Alan T. Moffet. 1966.. 31p. Contract Nonr-220 (19).

Unclassified report

Availability: Published in Annual Review of Astronomy and Astrophysics v4 p1-21 1966. Copies to DDC users only.

Descriptors: (*Galaxies, *Radio astronomy), Astronomical data, Stars, State-of-the-art reviews, Astrophysics

Information on the structure of radio galaxies is reviewed, together with the techniques used to obtain this information. Detailed information on brightness distribution is available only for three or four radio galaxies, while rough structural information is known for perhaps a hundred. Distances are accurately known only for radio galaxies identified with optical objects with measured red shifts. For objects with known distance, the observed properties, such as flux and angular size, may be converted to intrinsic properties, and values of these properties are given for several sample objects. A qualitative model for the evolution of a radio galaxy is discussed. Quantitative estimates of the energy requirements and various aspects of the evolution are described. Many questions about these objects remain to be answered. (Author)

AD-632 424 Fld. 3/2
OWENS VALLEY RADIO OBSERVATORY CALIF INST OF TECH PASADENA
DISTRIBUTIONS OF 10.6 CM WAVELENGTH LINEARLY POLARIZED RADIATION OVER EIGHT EXTRAGALACTIC RADIO SOURCES,
by G. A. Seielstad. 1966. 52p. Rept. no. 3, Contract Nonr-220 (19).

Unclassified report

Rept. on Observations of the Owens Valley Radio Observatory.

Availability: Published in The Astrophysical Journal. Copies to DDC users only.

Descriptors: (*Radio astronomy, *Galaxies), Distribution, S band, Microwave frequency, Extraterrestrial radio waves, Polarization, Astrophysics

The distributions of the 10.6-cm wavelength linearly polarized radiation from the radio sources 3C 33, 3C 98, Pictor A, 3C 270, Centaurus A (central component), Hercules A, 3C 353, and 3C 452 have been determined by fitting models to the measured Fourier transforms of the Stokes parameters I, Q, and U. With the exception of Hercules A each component of these double radio galaxies is significantly polarized, although the degree of polarization and the position angle of the plane of polarization are not necessarily the same. Furthermore, the polarization angle is not necessarily constant throughout an individual component. In every case the polarized regions are smaller than the total regions. It is suggested that the individual components of a double source are independent of one another and are not controlled by the parent galaxy. The degree of uniformity of the magnetic field within a component is independent of its age. In some cases the magnetic field is nearly homogeneous ove dimensions of the order of kiloparsecs or even tens of kiloparsecs. There is no obvious unique orientation of the magnetic field relative to the major axis. (Author)

AD-632 432 Fld. 3/2
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
SPECTROPHOTOMETRIC STUDIES OF GASEOUS NEBULAE. VI. THE NON-THERMAL RADIO-FREQUENCY SOURCE PLANETARY NGC 3242,
by S. J. Czyzak, L. H. Aller, J. B. Kaler, and D. J. Faulkner. 2 Aug 65. 13p. Rept. no. ARL-66-0044.
Proj. AF-7114-00-01.

Unclassified report

Prepared in cooperation with California Univ., Los Angeles, Dept. of Astronomy, and Mount Strombo Observatory, Australian National Univ., Canberra.

Availability: Published in The Astrophysical Journal v143 n2 p327-35 Feb 1966. Copies to DDC users only.

Descriptors: (*Radio astronomy, Nebulae), (*Nebulae, Spectroscopy), Interstellar matter, Spectrophotometers, Photographic analysis, Sources, Extraterrestrial radio waves, Astrophysics

The double-ringed planetary nebula NGC 3242 was recently shown to have a strong component of non-thermal radio-frequency radiation. A spectrophotometric study involving photoelectric and photographic methods was undertaken to establish intensities in the region 3130-5007. Determination of the electron density and temperature by methods involving forbidden lines yields T sub epsilon approx. 11500K and N sub epsilon approx. 6000 electrons/cc; the latter value is confirmed by surface-brightness measurements. (Author)

AD-632 512 Fld. 3/2
OWENS VALLEY RADIO OBSERVATORY CALIF INST OF TECH PASADENA
AN INTERFEROMETRIC STUDY OF JUPITER'S DECIMETER RADIO EMISSION,
by G. L. Berge. 1966. 42p. Contract Nonr-220 (19).

Unclassified report

Availability: Published in Astrophysical Journal p1-23 1966. Copies to DDC users only.

Descriptors: (*Radio astronomy, *Jupite (Planet)), Ultrahigh frequency, Extraterrestrial radio waves, Radio interferometers, Parabolic antennas, Antenna arrays, Radio telescopes, Astronomical observatories, California, Astrophysics

An interferometric study of the decimeter radio emission from the planet Jupiter has recently been carried out at the Owens Valley Radio Observatory. Using the two 90-ft paraboloids as an interference polarimeter, observations have been made with various east-west spacings ranging from 300 to 4700 lambda at 10.4 cm and 300 to 2300 lambda at 21.2 cm and also with some critical north-south spacings at 10.4 cm. The visibility functions obtained are in agreement with earlier measurements, which gave the polar and equatorial dimensions as one and three planetary diameters respectively, but they are more complete and extend to larger baselines. They permit the fitting of a rather detailed model for the decimeter brightness distribution. The observations are consistent with a symmetrical synchrotron emission source having the polarization properties one would expect with a dipole magnetic field. It probably is centered quite closely on the planetary disk, which is itself seen as a thermal radio source. The observations also indicate the presence of a small circularly polarized component in the radiation which varies in magnitude and sense as Jupiter rotates. The disk emission at 10.4 cm is about twice the thermal emission one would expect for a temperature of 130K. The implications of the various results are discussed. (Author)

AD-632 513 Fld. 3/2
CFSTI Prices: HC $1.00 MF $0.50
OWENS VALLEY RADIO OBSERVATORY CALIF INST OF TECH PASADENA
RADIO EMISSION FROM CLUSTERS OF GALAXIES,
by E. B. Fomalont, and D. H. Rogstad. 1966. 22p. Contract Nonr-220 (19).

Unclassified report

Descriptors: (*Radio astronomy, *Galaxies), Extraterrestrial radio waves, Radio interferometers, Stars, Optical properties, Correlation techniques, Astronomical observatories, California, Astrophysics

A radio survey of 21 cm continuum emission in 111 clusters of galaxies within a distance of 230 mpc contained in Abell's catalogue has been performed with the Owens Valley twin-element interferometer. 43% have radio emission greater than 0.2 flux units. Their radio luminosities are compared to the luminosity function of Longair, with the conclusion that a large fraction of the strong radio emitters are in Abell type clusters. The statistical properties of the sample indicates a possible correlation of detection probability with cluster richness. The radio structures and optical identifications suggest the emission is associated with the brightest cluster member or members, which have, in several cases, been classified as the D galaxy of Morgan. (Author)

AD-632 057 **See Fld. 20/13**

AD-632 310 **See Fld. 4/1**

AD-632 321 **See Fld. 20/4**

AD-632 444 **See Fld. 20/10**

3/3. CELESTIAL MECHANICS

AD-632 474 Fld. 3/3
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
SMALL ECCENTRICITY AND THE RESTRICTED PROBLEM OF THREE BODIES.
Professional paper,
by Richard B. Barrar. 17 Mar 66. 17p. Rept. no. SP-2394/000/00.

Unclassified report

Descriptors: (*N-body problem, *Celestial mechanics), Perturbation theory, Equations of motion, Complex variables

The author's previous work on the convergence of the Poincare-von Zeipel procedure is modified to apply to problems involving small eccentricity. The results are applied to the restricted problem of three bodies. (Author)

AD-632 021 **See Fld. 3/2**

Field 4-ATMOSPHERIC SCIENCES

4/1. ATMOSPHERIC PHYSICS

AD-631 896 Fld. 4/1, 20/6
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
SPECTRA OF LIGHT SCATTERED IN THE ATMOSPHERE AT THE HEIGHTS OF 5 AND 16 KM,
by G. Noci. 1961, 5p. Contract AF 61 (052)-80, AFOSR 2881

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n6 p625-8 Nov-Dec 1961. Copies to DDC users only.

Descriptors: (*Solar radiation, Scattering), (*Atmosphere, *Light transmission), Optics, Meteorological phenomena, Spectroscopy

The spectral distribution of the scattered sunlight, at 5000 and 16000 m above sea level was calculated on the basis of some simplifying hypothesis. The approximations used are discussed and justified, and the method adopted for calculations is described. No considerable differences are found between the spectrum at 5000 m and the one at 16000 m, respectively; in addition, these spectra do not agree with the black-body spectra. Such a comparison is graphically illustrated. (Author)

AD-632 264 Fld. 4/1
CFSTI Prices: HC $1.00 MF $0.50
KIRUNA GEOPHYSICAL OBSERVATORY (SWEDEN)
LATITUDINAL AND DIURNAL VARIATIONS OF THE IONOSPHERIC ELECTRON CONTENT NEAR THE AURORAL ZONE IN WINTER.
Scientific rept.,
by Ludwik Liszka. 7 Dec 65, 12p. Rept. no. Scientific-11,
Contract AF 61 (052)-678,
AFCRL 66-223

Unclassified report

Descriptors: (*Ionosphere, *Electron density), (*Atmospheric sounding, Electron density), Satellites (Artificial), Radio transmission, Magneto-optic effect, Diurnal variations, Sweden

The analysis of three month's observations of Faraday rotation observed on S-66 transmissions made at Kiruna Geophysical Observatory (67.8 degrees N, 20.3 degrees E) is presented. The ionospheric electron content along the subionospheric path of the satellite was computed for almost 400 transits. Also effective slab thicknesses were calculated using critical frequency values from 6 Scandinavian stations, covering an interval of 10 degrees of latitude. Latitudinal and diurnal variations of the ionospheric electron content and the effective thickness were studied. The most striking feature of the latitudinal variation of the total electron content was a distinct minimum at the southern boundary of the auroral zone during winter night-time. This minimum coincides with the 'trough' observed by topside sounding satellites. (Author)

AD-632 266 Fld. 4/1, 20/9
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
A STUDY OF WAVE PARTICLE INTERACTIONS IN THE MAGNETOSPHERE AND A COMPLEMENTARY STUDY OF THE PROPAGATION CHARACTERISTICS OF WHISTLERS AND RELATED PHENOMENA.
Final rept.,
by R. A. Helliwell. Mar 66, 13p. Contract AF-AFOSR-783-65,
AFOSR 66-0715

Unclassified report

Descriptors: (*Whistlers, Propagation), (*Upper atmosphere, *Plasma physics), Very low frequency, Atmospherics, Demodulators, Gas ionization, Luxemberg effect, Radio transmission, Electron density, Geophysics

Three principal areas of investigation are reviewed: (1) Propagation and detection studies at vlf; (2) basic studies of the thermal plasma in the magnetosphere; (3) wave particle interactions. In most cases only a brief description is given, particularly where details are available in reports and publications listed in the attached bibliography. In addition to the bibliography, there is included a list of papers presented at technical meetings and symposiums.

AD-632 310 Fld. 4/1, 3/2
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
COSMIC NOISE ABSORPTION: COMPILATION OF ABSTRACTS.
Rept. no. 1 on ATD work assignment no. 79, task 17.
16 Mar 66, 84p. Rept. no. ATD-66-25, TT 66-61205

Unclassified report

Compilation of abstracts based on Soviet open sources pub. 1964 and 1965. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Extraterrestrial radio waves, Absorption), (*Atmosphere, Extraterrestrial radio waves), (*Cosmic rays, Ionospheric disturbances), Astrophysics, Geophysics, Abstracts, Bibliographies, USSR

This compilation of abstracts is based on Soviet open sources published in 1964 (with one citation published in 1965). It is the first in a series of reports reviewing Soviet research on cosmic noise absorption. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 68 abstracts are arranged alphabetically by author. A bibliography comprising 68 entries is presented at the end of the report. Earlier information (1962-1963) on the subject can be found in ATD Report U-64-109, a compilation of abstracts carrying the same title as the present report. Other data covered: seasonal changes in ionospheric disturbances, abnormal ionization of F2 layer, vertical movement velocity of lower ionosphere, antenna measurement of F2 region reflection indexes, radio wave absorption, ionosphere-troposphere relationship, behavior of sporadic E layer, E-F region of ionosphere during total solar eclipse, riometer, radio wave reflection, and electric conductivity. (Author)

AD-632 315 Fld. 4/1, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE POSSIBILITY OF MEASURING ATOMIC OXYGEN AT THE HEIGHT OF 100 - 150 KM BY THE HEAT TRADUCER METHOD,
by S. P. Perov, and A. F. Chizhov. 30 Mar 66, 17p. Rept. no. FTD-TT-65-1416, TT 66-61208

Unclassified report

Unedited rough draft trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n56 p121-7 1964.

Descriptors: (*Oxygen, Upper atmosphere), (*Test methods, Upper atmosphere), Atoms, Probes, Measurement, Resistance thermometers, Recombination reactions, Heat flux, Atmospheric sounding, USSR

In the article there is shown the principle of the possibility of measuring the concentration of atomic oxygen in the atmosphere at the height of 100 - 150 km by the method of the heat traducer, the sensitive element of which is heated with the recombination of the atoms of oxygen on its surface (heat effect of recombination). (Author)

AD-632 343 Fld. 4/1, 20/6
CFSTI Prices: HC $4.00 MF $1.00
JOHANNES GUTENBERG UNIVERSITAET MAINZ (WEST GERMANY) METEOROLOGISCH- GEOPHYSIKALISCHES INSTITUT
RESEARCH ON ATMOSPHERIC OPTICAL RADIATION TRANSMISSION,
by K. Bullrich, E. de Bary, K. Danzer, R. Eiden, and G. Hanel. Jan 66, 140p. Rept. no. Scientific-4, Contract AF 61 (052)-595, AFCRL 66-212

Unclassified report

Descriptors: (*Light transmission, *Atmosphere), (*Optics, Atmosphere), Aerosols, Particle size, Light, Scattering, Polarization, Atmospheric motion, Atmospheric refraction, Refractive index, Graphics, West Germany

Part A: Influence of the natural atmospheric particles with noncontinuous size distribution on light scattering processes. Part B: Analysing method of measured light scattering of a unit volume of turbid air. Part C: Elliptical polarized light of a unit volume of turbid air. Part D: Measurements of the sun's aureole intensity. Part E: Refractive index of atmospheric dust particles. (Author)

AD-632 408 Fld. 4/1
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A NOTE ON THE NON-UNIQUENESS OF THE UMKEHR METHOD B.
Research translation,
by Li Li-bin, Huang Xin-yu, and Li Jun. Mar 66, 12p. Rept. no. Emm-65-40,
Contract AF 19 (628)-5073,
TT 66-61215

Unclassified report

Trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) v13 n1 p20-3 1964.

Descriptors: (*Ozone, *Atmosphere), Distribution, Atmospheric sounding, Numerical methods + procedures, Meteorology, China

The umkehr method B is used to determine the fine structure of the vertical distribution of atmospheric ozone. Essentially, the curve representing the vertical ozone distribution is continuous and smooth. In the method B, a block distribution diagram is used to replace this continuous curve. An optimum block distribution diagram is then obtained by the method of successive approximation. Based on the trend of variation of the optimum block diagram, the smooth curve connecting the areas may be considered approximately as the curve for the vertical ozone distribution.

AD-632 546 Fld. 4/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
COMMENTS ON A PAPER BY V. R. NOONKESTER, 'NON-DIURNAL E-LAYER VARIATION AT WASHINGTON, D. C.'.
Environmental research papers,
by N. J. Macdonald. 1 Aug 65, 7p. Rept. no. AFCRL-66-236,AFCRL-ERP-185
Proj. AF-8628, Task 862004,

Unclassified report

Availability: Published in Journal of Atmospheric and Terrestrial Physics, v28 p263-5 1966. Copies to DDC users only.

Descriptors: (*Ionosphere, Diurnal variations), (*Ionospheric disturbances, *Sunspots), District of Columbia, Atmosphere, Spectroscopy

The quasi-periodic 27-day variations of f sub 0 E at Washington are significantly related to corresponding variations of the sunspot number. (Author)

AD-632 547 Fld. 4/1, 14/2, 9/5, 22/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PLASMA SHEATH EFFECTS ON ROCKET ANTENNAS.
Air force surveys in geophysics,
by W. Pfister, and J. C. Ulwick. Apr 66, 15p.
Rept. no. AFCRL-66-233,AFCRL-AFSG-177
Proj. AF-7663, Task 766303,

Unclassified report

Availability: Published in Interactions of Space Vehicles with an Ionized Atmosphere, p271-81 1965. Copies to DDC users only.

Descriptors: (*Atmospheric sounding, Probes (Electromagnetic)), (*Probes (Electromagnetic), *Rocket antennas), Ionosphere, Ionization, Electron density, Plasma sheath, Electrical impedance, Probes, Sounding rockets

Two Aerobee 150 rockets equipped with an antenna impedance probe and a retarding potential probe have been flown around noontime. The results are interesting with respect to expected and unexpected plasma effects. Although the ion sheath around the antenna had been changed by a dc sweep voltage between rocket body and antenna, no effect on the impedance could be detected up to the highest reliable measurements at 140 km altitude. At greater heights outgassing of rocket fuel caused a reduction of electron density around the antenna by a process of attachment. Quantitative estimates indicate that the leaking gas, most likely the liquid fuel, is a very effective attaching agent. (Author)

AD-632 562 Fld. 4/1
CFSTI Prices: HC $2.00 MF $0.50
NEW MEXICO UNIV ALBUQUERQUE DEPT OF PHYSICS AND ASTRONOMY
THE PREPARATION OF CHEMILUMINESCENT SUBSTANCE FOR THE MEASUREMENT OF ATMOSPHERIC OZONE. THE PRODUCTION OF ACCURACY KNOWN, VERY SMALL QUANTITIES OF OZONE IN AN AIR STREAM. NOTE ON OZONE MEASUREMENTS WITH THE CHEMILUMINESCENT SONDE.
Final rept.,
by Victor H. Regener, and Leon Zolotnitzky. 31 Mar 66, 30p. Contract AF 19(628)-417, Proj. AF-8631, Task 863102,
AFCRL 66-246

Unclassified report

Descriptors: (*Ozone, *Atmosphere), Chemiluminescence, Measurement, Calibration, Analysis, Meteorological balloons, Materials

The report gives the details of the procedure for the preparation of the chemiluminescent substance, the construction of an accurate source of small concentrations of ozone for calibration purposes, and a short discussion of the method for the evaluation of ozone measurements from balloons with the chemiluminescence method. (Author)

AD-632 565 Fld. 4/1, 20/14, 20/9
CFSTI Prices: HC $2.00 MF $0.50
NEWCASTLE UNIV (AUSTRALIA) DEPT OF PHYSICS
PROPAGATION OF PCL MICROPULSATIONS IN AN IONOSPHERIC DUCT.
Scientific rept.,
by R. N. Manchester. Feb 66, 48p. Rept. no. Research Pub-14,
Contract Nonr (G)-00027-65, Proj. NR-371-110,

Unclassified report

Descriptors: (*Atmospherics, *Magnetohydrodynamics), (*Ionospheric propagation, Magnetohydrodynamics), Ionosphere, Diurnal variations, Electromagnetic waves, Propagation, Ionospheric disturbances

The propagation mechanism of Pc1 micropulsations from their relatively high generation latitude to middle and low latitudes is considered. The study is confined to the type of micropulsations commonly known as pearls or hm emissions. It is shown that propagation probably takes place in a duct centred on the F region of the ionosphere. The diurnal variations of the duct properties are calculated, using typical profiles for the ionospheric parameters at the time of sunspot minimum. It is shown that the duct has a low frequency cutoff at about 0.5 c/s, implying that the lack of low frequency events at middle latitudes may be largely a propagation effect. Duct attenuation is very small during the night hours when the majority of Pc1 events are observed at middle latitudes, but is very large during the day. The calculated average horizontal component of the phase velocity for propagation in the duct is of the same order as that given in initial reports of experimental observations. (Author)

AD-631 833 **See Fld. 8/14**

AD-632 164 **See Fld. 20/3**

AD-632 259 **See Fld. 8/14**

AD-632 299 **See Fld. 20/14**

AD-632 607 **See Fld. 20/1**

4/2. METEOROLOGY

AD-631 950 Fld. 4/2, 14/2
CFSTI Prices: HC $1.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
ELECTRICALLY OPERATED IMPACTORS FOR HYDROMETEOR SAMPLING.
Technical rept.,
by Harold W. O'Brien, and Motoi Kumai. Dec 65, 21p. Rept. no. TR-170,
Proj. DA-1V014501B52A02,

Unclassified report

Descriptors: (*Atmospheric precipitation, Measurement), (*Meteorological instruments, Samplers), (*Aerosols, *Samplers), Particle size, Fog, Clouds, Water, Drops, Sampling, Remote control systems, Electrical equipment

Two models of impactors have been designed for remote sampling of hydrometeors. One, a flashbulb-activated model, is quite suitable for multiple simultaneous sampling, but is prone to occasional mechanical failure. The other, a solenoid-operated model, is almost failure proof but requires considerably more electrical current for multiple simultaneous sampling than does the flash type unit. Results of some laboratory tests on the impactors are shown and field use of the impactors is discussed. The appendix contains electrical specifications for each type of unitt (Author)

AD-631 956 Fld. 4/2
DEPARTMENT OF TRANSPORT TORONTO (ONTARIO) METEOROLOGICAL BRANCH
MONTHLY BULLETIN: CANADIAN UPPER AIR DATA.
Oct 65, 100p.

Unclassified report

Availability: Available from Dept. of Transport, Toronto (Ontario) $5.00 per yr., $0.50 per issue.

Descriptors: (*Climatology, *Canada), (*Meteorology, Canada), Upper atmosphere, Meteorological parameters, Tables

Altitude is entered in geopotential meters or geopotential kilometers above m.s.l. Temperature is entered in degrees and tenths Celsius. Interpolated temperature values for levels occurring within a stratum of missing data and extrapolated temperature values for levels to which data have been extrapolated beyond the terminating level of the ascent are entered to the nearest whole degree. Potential temperature is entered in whole degrees Kelvin. Pressure is entered to the nearest whole millibar. When the pressure at the freezing level or the maximum wind level exceeds 999 mb., the thousands digit is omitted. Wind direction is entered as the number of degrees from true north .000 for wind direction represents calm conditions. Wind speed is entered to the nearest whole meter per second . 00 for vector mean wind speed indicates a speed of less than 0.5 meters per second. (Author)

AD-631 963 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SOME RESULTS OF RADAR INVESTIGATION OF WIND FIELD STRUCTURE AT HEIGHTS OF 50 TO 700 METERS.
Research translation,
by A. G. Gorelik, and A. A. Chernikov. Mar 66, 24p. Rept. no. T-R-511,
Contract AF 19(628)-3880,
TT 66-61155

Unclassified report

Nekotore Rezultaty Radiolokatsionnogo Issledovaniya Struktury Polia Vetra na Vysotakh 50-700 m, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p3-18 1964.

Descriptors: (*Meteorological radar, Wind), (*Wind, Radar scanning) (*Atmospheric sounding, Meteorological radar), Micrometeorology, Atmospheric motion, Boundary layer, Surface area, Wind-direction indicators, Meteorological instruments, USSR

This paper presents the results of a radar investigation of wind field structure in the atmospheric surface boundary layer. The observational method and results are described, and the latter are compared with the data of other authors. The effect of the entrainment of particles on the results of radar measurements of wind speedvariations and the effect of variations of wind speed and direction on the accuracy of rawin observations are discussed. (Author)

AD-631 964 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
EVALUATION OF ARTIFICIAL-MODIFICATION EFFICIENCY FROM THE POLARIZATION CHARACTERISTICS OF THE ECHO SIGNAL.
Research translation,
by S. P. Morgunov, and A. B. Shupiatskii. Jan 66, 13p. Rept. no. T-R-514,
Contract AF 19(628)-3880,
TT 66-61156

Unclassified report

Otsenka Effektivnosti Iskusstvennykh Vozdeistvii po Poliarizatsionnym Kharakteristikam Ekho-Signala, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p49-54 1964.

Descriptors: (*Meteorological radar, Artificial precipitation), (*Artificial precipitation, Radar scanning), Clouds, Meteorological parameters, Radar echo areas, Spectrum signatures, Polarization, Meteorology, USSR

The use of the polarization method is discussed as one of the criteria for evaluatng the effectiveness of (cloud) modification. There is a brief outline of a method suitable for a radar with one movable antenna, and some results of measurements made during artificial modifications are given. (Author)

AD-631 965 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
FORECASTING THE NOCTURNAL TEMPERATURE VARIATION OF THE ATMOSPHERIC SURFACE BOUNDARY LAYER.
Research translation,
by M. E. Berliand, and V. P. Gracheva. Jan 66, 23p. Rept. no. T-R-489,
Contract AF 19 (628)-3880,
TT 66-61157

Unclassified report

K Progonozu Nochnogo Izmeneniya Temperatury Prizemnogo Sloya Vozdukha, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n127 p35-47 1962.

Descriptors: (*Weather forecasting, *Atmospheric temperature), (*Micrometeorology, Atmospheric temperature), Atmosphere, Boundary layer, Surface area, Earth (Planet), Meteorological parameters, Diurnal variations, Mathematical analysis, USSR

It is proposed that the method of forecasting the nocturnal temperature variation of the atmospheric surface boundary layer be refined by taking into account the prior temperature variation. The examination first covers the general case, where the prior temperature variation at the level of the instrument shelter is given as an arbitrary function of time in agreement with observational data. Next, it is shown that for practical purposes, the epresentation of the prior temperature variation can be confined to a periodic function, and a solution to the problem is given for this case. The resulting solution is taken as the basis for a system of calculation that is sufficiently convenient for operational use in the weather station network and at the weather office. (Author)

AD-631 966 Fld. 4/2, 17/9
CFSTI Prices: HC $2.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SOME RESULTS OF RADAR OBSERVATIONS OF THE DEVELOPMENT OF CU CONG CLOUDS AND THE RESULTS OF MODIFICATION.
Research translation,
by A. M. Borovikov, V. V. Kostarev, and A. B.Shupiatskii. Mar 66, 27p. Rept. no. T-R-510,
Contract AF 19 (628)-3880,
TT 66-61158

Unclassified report

Nekotore Rezultaty Radiolokatsionnykh Nabliudenii Evoliutsii Moshchno-Kuchevykh Oblakov i Rezultatov Vozdeistviya, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p24-40 1964.

Descriptors: (*Meteorological radar, Clouds), (*Clouds, Radar scanning), (*Thunderstorms, Radar scanning), Radar echo areas, Cumulonimbus clouds, Hail, Reduction, Meteorology, USSR

The apparatus and methods for radar observations of the development of Cu cong and Cb clouds are discussed. Analysis of the observational data provided preliminary indications of the hail content of Cb clouds, and some criteria are proposed for determining the effect of artificial modification aimed at preventing hail damage. (Author)

AD-631 967 Fld. 4/2, 17/9
CFSTI Prices: HC $2.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
JOINT RADAR AND AEROLOGICAL OBSERVATIONS IN THE LOWER 1.5 KM OF THE ATMOSPHERE.
Research translation,
by G. B. Brylev, I. V. Vasilchenko, V. I. Selitskaya, and A. A. Fedorov. Mar 66, 26p. Rept. no. T-R-523,
Contract AF 19 (628)-3880,
TT 66-61159

Unclassified report

Sovmestne Radiolokatsionne i Aerologicheskie Nabliudeniya v Nizhnem 1,5-km sloe Atmosfery, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n173 p76-90 1965.

Descriptors: (*Meteoroligical radar, Clear air turbulence), (*Clear air turbulence, Radar echo arears), (*Radar scanning, Clear air turbulence), (*Atmospheric sounding, Meteorological radar), Meteorological parameters, Electronic recording systems, Meteorological instruments, Meteorology, USSR

The results of joint radar and aerological observations in the lower 1.5 km of the atmosphere are discussed, and a connection is indicated between radar echoes from a clear sky and convective and turbulent motions in the atmosphere. (Author)

AD-631 968 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
ACCURACY OF DETERMINING CLOUD BOUNDARIES BY RADAR.
Research translation,
by G. I. Kulikova, G. T. Nikandrova, and V. A. Petrushevskii. Feb 66, 18p. Rept. no. T-R-531,
Contract AF 19 (628)-3880,
TT 66-61160

Unclassified report

Tochnost' Izmereniya Granits Oblakov Radiolokatsionnyn Metodom, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad, Trudy (USSR) n173 p9-18 1965.

Descriptors: (*Meteorological radar, *Cloud height indicators), Clouds, Configuration, Determination, Radar scanning, Effectiveness, Meteorological instruments, Meteorlogical instruments, Meteorology, USSR

The fields of cloud heights as measured by radar and by aircraft are compared, and the errors in the determination of cloud boundaries by radar are examined. The accuracy of the determination of cloud boundaries is evaluated on the basis of experimental data. (Author)

AD-632 016 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
METEOROLOGY RESEARCH INC ALTADENA CALIF
ANALYSIS OF FLAGSTAFF DATA.
Rept. no. 4, 1 Nov 64-31 Dec 65 (Final),
by Paul B. MacCready Jr., Theodore B. Smith, and Alan I. Weinstein. Apr 66, 48p. Contract DA-28-043-AMC-00406 (E), Proj. DA-1VO-14501-B-53A-06,
ECOM 00406-F

Unclassified report

See also AD-627 147.

Descriptors: (*Clouds, Phase studies), (*Raindrops, Nucleation), (*Storms, Dynamics), Meteorological instruments, Water vapor, Convection (Atmospheric), Atmospheric condensation, Meteorological phenomena, Meteorological parameters, Scientific research, Arizona

The continuous particle collector proved capable of yielding quantitative droplet distribution data and qualitative information on larger hydrometeors. In the Flagstaff convective clouds the droplet concentrations were high, 600 to 2000 per cc near cloud base, and some correlation was noted versus upcurrent strength. Drizzle-size drops grew in the cloud cores by coalescence, starting from large droplets (substantially larger than the small-droplet population) which were present even at cloud base in concentrations of 20 per liter. A possible source of such large droplets is considered to be giant salt particles, perhaps augmented from a maritime condensation nuclei distribution by coalescence effects in previous clouds. The growth rate of droplets on such nuclei is calculated for several parcel ascent rates. Graupel was encountered regularly at -5 and -6C, mostly outside cell cores, suggesting the rapid freezing and rimming of the drizzle-size drops. The principles of cloud modification techniques are considered. They show that the transitory seeding methods used in 1962 and 1963 would not be expected to show large effects, and so techniques are suggested which consider diffusion effects and cloud seedability (especially buoyancy aspects). (Author)

AD-632 160 Fld. 4/2, 9/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
RESOLUTION OF A RADAR ANTENNA FOR DISTRIBUTED TARGETS.
Environmental research papers,
by Ralph J. Donaldson Jr.. 15 May 65, 18p.
Rept. no. AFCRL-66-147, AFCRL-ERP-173
Proj. AF-6672, Task 667205,X

Unclassified report

Availability: Published in Journal of Applied Meteorology v4 n6 p727-40 Dec 1965. Copies to DDC users only.

Descriptors: (*Radar antennas, Resolution), (*Meteorological radar, *Radar reflections), Antenna radiation patterns, Distortion, Antenna lobes

The measured reflectivity of a distributed target is given by the integration of reflectivity over the radar antenna radiation pattern. Assuming a Gaussian form for the main antenna lobe and fairly simple exponential and Gaussian distributions of true reflectivity, the measured reflectivity is computed as a function of sharpness of reflectivity relative to antenna beam size. The resolving power of the radar antenna for measurement of a single reflectivity feature to a specified accuracy, or for discrimination between two identical features, is also a function of relative sharpness of the target reflectivity field. Relative sharpness is defined by the product of reflectivity gradient, range, and half-power beam radius (exponential case) or of derivative of reflectivity gradient, range squared, and half-power beam radius squared (Gaussian case). Relative sharpness is also a determining factor of the size of the area in which side-lobe errors may be considered negligible. A method is developed for recovery of the gross structure of true reflectivity from measurements. The intersection of the true reflectivity distribution, so derived, with a standard equivalent reflectivity factor of 0.1 mm6 m to the -3 is suggested as an objective estimate of cloud tops measured by radar. (Author)

AD-632 161 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
A PILOT STUDY OF SMALL-SCALE WIND VARIATIONS IN THE STRATOSPHERE AND MESOSPHERE.
Environmental research papers (Revised ed.),
by R. E. Newell, J. R. Mahoney, and R. W. Lenhard Jr.. 12 Jul 65, 19p. Rept. no. AFCRL-ERP-181, AFCRL-66-190
Proj. AF-8624, Task 862401,

Unclassified report

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Contract AT (30-1)2241. Revision of manuscript submitted 22 Dec 64.

Availability: Published in Quarterly Journal of the Royal Meteorological Society v92 n391 p41-54 Jan 1966. Copies to DDC users only.

Descriptors: (*Wind, *Upper atmosphere), Atmospheric sounding, Falling bodies, Spheres, Balloons, Wind-direction indicators, Stratosphere, Atmospheric motion, Meteorological charts

A series of high resolution ROBIN falling-sphere soundings covering the altitude range from 70 to 27 km have been examined in detail. Small-scale wind variations with height are evident throughout. From profiles of the zonal wind components the apparent amplitudes and half-wavelengths have been tabulated and summarized for 19 cases, divided into two seasons. A data-reduction technique which imposes variable smoothing upon the initial balloon-position data complicates the analysis, but the existence of wind fluctuations with vertical half-wavelengths between 300 m and a few kilometres is definitely established. A linear theory which takes into account the effects of rotation and temperature lapse rate upon such motions is briefly discussed. It is shown that the vertical flux of energy associated with the motions may be an important energy source for the atmosphere above about 80 km. A firm estimate of the magnitude of the vertical energy flux requires further information about the periods and/or the horizontal scales of the observed motions. (Author)

AD-632 173 Fld. 4/2
WEATHER BUREAU WASHINGTON D C
MANUAL OF SURFACE OBSERVATIONS (WBAN). CIRCULAR N.
Seventh ed. (Revised to include Changes 1 to 13). Apr 66, 254p.
NAVWEPS 50-1D-505

Unclassified report

Prepared in cooperation with the Dept. of the Air Force and the Dept. of the Navy.

Availability: Superintendent of Documents, GPO, Washington, D. C., 20402, $1.50, as C30.4:N/966.

Descriptors: (*Weather forecasting, Instruction manuals), Meteorological parameters, Weather communications, Standardization, United States Government, Armed Forces (United States), Meteorology

This manual was prepared by Weather Bureau personnel, with the collaboration of representatives of the Air Force and Navy, to secure uniformity in taking and recording surface observations. It has been approved by appropriate officials of the Weather Bureau, Air Force, and Navy for joint use, as indicated by the abbreviation WBAN appearing in the title. Therefore, the instructions are equally directive upon all meteorological personnel of these three organizations.

AD-632 347 Fld. 4/2, 16/2, 19/4
CFSTI Prices: HC $1.00 MF $0.50
ATMOSPHERIC SCIENCES LAB WHITE SANDS MISSILE RANGE N MEX
METEOROLOGICAL DATA REPORT: NIKE-APACHE STV (SR-026) (29 MARCH 1966),
by Gordon L. Dunaway. Apr 66, 21p. Rept. no. 8,
Task DA-IV650212A127-02,

Unclassified report

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Test facilities, New Mexico

Meteorological data gathered for the launching of Nike-Apache STV (SR-026), are presented for the Ballistic Systems Division, U. S. Air Force, and for ballistic studies. The meteorological data and resulting ballistic data appear in tabular form. (Author)

AD-632 348 Fld. 4/2, 16/2, 19/4
CFSTI Prices: HC $2.00 MF $0.50
ATMOSPHERIC SCIENCES LAB WHITE SANDS MISSILE RANGE N MEX
METEOROLOGICAL DATA REPORT: AEROBEE AF 3.524 (30 MARCH 1966),
by Marjorie McLardie Hoidale. Apr 66, 31p. Rept. no. DR-9,
Task DA-IV650212A127-02,

Unclassified report

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Test facilities, New Mexico

Meteorological data gathered for the launching of Aerobee AF 3.524 are presented for the Air Force Cambridge Research Center and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form. (Author)

AD-632 349 Fld. 4/2, 16/2, 19/4
CFSTI Prices: HC $2.00 MF $0.50
ATMOSPHERIC SCIENCES LAB WHITE SANDS MISSILE RANGE N MEX
METEOROLOGICAL DATA REPORT: AEROBEE NASA 4.143 NA (14 APRIL 1966) AND AEROBEE NASA 4.24 US (14 APRIL 1966),
by Marjorie McLardie Hoidale. May 66, 35p. Rept. no. DR-11,
Task DA-1V650212A127-02,

Unclassified report

Descriptors: (*Meteorology, Guided missile ranges), (*Ballistics, Meteorology), (*Atmospheric sounding, Guided missile ranges), Meteorological parameters, Rocket trajectories, Impact prediction, Rocket research, Test facilities, New Mexico

Meteorological data gathered for the launching of Aerobee NASA 4.143 NA and Aerobee NASA 4.24 US are presented for the National Aeronautics and Space Administration, the University of Colorado, and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form. (Author)

AD-632 401 Fld. 4/2
CFSTI Prices: HC $1.60 MF $0.50
RAND CORP SANTA MONICA CALIF
THE ROLE OF THE ELECTROSTATIC FIELD IN THE COAGULATION OF FOG AND CLOUD DROPLETS,
by J. D. Sartor. 25 Jan 60, 15p. Rept. no. P-2134,

Unclassified report

Prepared for publication in the Proceedings of the Fog Research and Modification Planning Session, (1st) Boston Mass. January 25-26, 1960.

Descriptors: (*Coagulation, Electrostatic fields), (*Clouds, Coagulation), (*Fog, Coagulation), (*Electrostatic fields, *Atmospheric condensation), Drops, Atmospheric motion

The electrostatic field of the atmosphere is normally enhanced in fog and cloud. This field, even when quite small, can effect the combination of colliding but otherwise noncoalescing droplets. Stronger fields produce forces of mutual attraction among the droplets. Preliminary results on the degree to which electrostatic forces act to modify the motion of cloud droplets are presented. Methods for the possible modification of the field are discussed. (Author)

AD-632 406 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A METHOD FOR CALCULATING THE VERTICAL MOTIONS AND THE DISTRIBUTION OF THE HEAT SOURCES AND SINKS IN THE STRATOSPHERE OVER THE NORTHERN HEMISPHERE IN JANUARY 1958.
Research translation,
by Sun Shwu-ching. Mar 66, 26p. Rept. no. Emm-65-19,
Contract AF 19 (628)-5073,
TT 66-61213

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n4 p397-408 1964.

Descriptors: (*Atmospheric motion, *Stratosphere), (*Thermodynamics, Stratosphere), Northern Hemisphere, Atmosphere, Heating, Convection (Atmospheric), Vortices, Mathematical analysis, Meteorology, Climatology, China

A new method was proposed for the computation of the vertical motions in the stratosphere by integrating the vorticity equation with respect to pressure downward from the upper boundary of the stratosphere. This method is shown to be superior to the one based on the integration of the same equation upward from the surface of the ground. Using the more reliable values of vertical motions obtained by the former method, the mean non-adiabatic heating in the stratosphere (10-100 mb) is then computed by means of the first law of thermodynamics. The basic data used are taken from the monthly mean pressure and air temperature charts for the stratosphere of the northern hemisphere for January 1958. It is found that for the middle levels of the stratosphere, the distribution of heat sources and sinks is characterized by large-scale features, similar to those of the pressure field at these levels. The ultra-long waves (with wave number of one or two) are far more predominant than waves of other scales. The geographical distribution of heating and cooling in relation to the pressure systems is also discussed. (Translator)

AD-632 407 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A PRELIMINARY STUDY OF THE CHARACTERISTICS AND EVOLUTION OF THE MEAN MONTHLY CIRCULATION AT THE 500-MB LEVEL OVER THE NORTHERN HEMISPHERE, (II) ULTRA-LONG WAVES.
Research translation,
by Wang Shao-wu. Mar 66, 28p. Rept. no. Emm-65-18,
Contract AF 19 (628)-5073,
TT 66-61214

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n3 p316-28 1964.

Descriptors: (*Atmospheric motion, Northern Hemisphere), (*Climatology, Atmospheric motion), Meteorology, Harmonic analysis, China

The conclusions are as follows: (1) There are pronounced seasonal patterns in the (relative) amplitudes of the first and third harmonics with a strong negative correlation between the two. The (relative) amplitudes of both the first and third harmonics at 55 degrees N are negatively correlated to their counter parts at 35 degrees N. No significant seasonal variation is indicated for the relative amplitude of the second harmonic. (2) The change of the phase angle shows a regular seasonal course at 55 degrees N except for the second harmonic. (3) The variation of the spectrum shows that the seasonal variation is different from year to year but the general trend is the same for all years. (4) The characteristics of the spectrum of transitional seasons are clearly distinct from those of summer and winter and therefore the natural synoptic seasons may be clearly defined. The beginning and ending as well as the length and character of the seasons vary from one year to another. (5) The weather anomaly in China has a close relationship with the pattern of ultra-long waves in the northern hemisphere. This may be shown by the examples of July 1954 and 1959 and February 1957 and 1960. (Translator)

AD-632 413 Fld. 4/2
CFSTI Prices: HC $1.10 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY

SOME PROBLEMS CONCERNING THE EAST ASIATIC MONSOON,
by Kao Yu-hsie. 1965, 3p. Rept. no. Emm-65-49 (a),
Contract AF 19 (628)-5073,
Unclassified report

Translated summary and table of contents appearing in the monograph.

Descriptors: (*Climatology, Far East), (*Meteorology, Far East), Wind, Rainfall, Geography, China

This monograph is a part of the report of a research project on the problems of the east Asiatic monsoon carried out by the Institute of Geophysics and Meteorology, Academia Sinica during the past several years. It consists of three parts. The first part presents a critical survey of the past views and research approaches of meteorologists in different countries to the monsoon problem and includes a summary of the author's (Kao's) views. The second part discusses in greater detail the formation factors of the east Asiatic monsoon climate and some of its characteristic features in China. It proposes a division of China into different monsoon regions. The third part studies the development in summer and decay in winter of the monsoon in relation firstly to the seasonal variation of the general circulation, and secondly to the beginning and end of the rainy season in China. Based on the studies outlined above, tentative conclusions on the problems are given. This reference monograph is intended for those working in the fields of meteorology, climatology and geography. (Translator)

AD-632 515 Fld. 4/2, 16/2, 19/4
CFSTI Prices: HC $3.00 MF $0.75
ATMOSPHERIC SCIENCES LAB WHITE SANDS MISSILE RANGE N MEX
METEOROLOGICAL DATA REPORT. ATHENA FLIGHT NO. 039 (31 MARCH 1966) AND ATHENA FLIGHT NO. 040 (31 MARCH 1966),
by Harold M. Richart. May 66, 66p. Rept. no. DR-10,
Task DA-1V650212A127-02,
Unclassified report

Descriptors: (*Atmospheric sounding, Guided missile ranges), (*Ballistics, Meteorological parameters), (*Meteorology, Guided missile ranges), Rockets, Rocket trajectories, Impact prediction, Launching sites, Utah

Meteorological data gathered for the launching of Athena Flight Number 039, Vehicle no. B-009 and Athena Flight Number 040, Vehicle no. D-019 are presented for the Air Force Ballistic Missile Re-entry Systems Office and for ballistic studies. The data are presented in tabular form. (Author)

AD-632 561 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
RELATIONSHIPS BETWEEN TROPICAL PRECIPITATION AND KINEMATIC CLOUD MODELS.
Rept. no. 9 (final), 15 Aug 65-14 Feb 66,
by G. Arnason, and A. F. Saunders. Apr 66, 28p. Rept. no. 7469-211,
Contract DA-28-043-AMC-01219 (E), Proj. DA-1V0-14501-B-53A-09,
ECOM 01219-F
Unclassified report

Descriptors: (*Clouds, Dynamics), (*Convection (Atmospheric), Clouds), Tropical regions, Atmospheric precipitation, Buoyancy, Bubbles, Humidity, Atmospheric motion, Mathematical models

The formation and dissipation of a convective roll-type cloud are simulated by means of a numerical experiment. Initially, a buoyant bubble near the lower boundary is introduced into statically stable surroundings saturated with moisture, and the equations of motion, continuity, and thermodynamics are solved numerically. The computed events show the bubble to rise, an associated toroidal circulation of a narrow, intense updraft to form, and cloud to form in the area of ascending motion. Because of the stable surroundings, gravitational oscillations are set up, and the initial one-cell circulation is gradually replaced by three circulation cells, two of which rotate in the opposite sense of that of the original cell. As a result of this breakup into cells, the initial updraft weakens and gradually becomes a downdraft leading to the dissipation of the cloud. It is concluded that there are presently two limitations to further extension of the present program of numerically simulating cloud convection. One is the shortcomings of available finite difference schemes; the other the limiting capacity of existing computers. (Author)

AD-632 597 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
VARIABILITY OF ROCKET-MEASURED WINDS.
Technical rept.,
by Marvin J. Lowenthal. Apr 66, 28p. Rept. no. ECOM-2693,
Proj. DA-1V0-14501-B-53A, Task 03,
Unclassified report

Descriptors: (*Wind, Oscillation), (*Atmospheric sounding, Wind), Sounding rockets, Guided missile ranges, Atmospheric motion, Kinetic energy, Statistical analysis

Variability of rocket winds has been investigated using as a statistic mean vector wind differences for various time intervals from less than one hour to 24- and 48-hour periods. In all cases the variability increases with height in the 30- to 60-km region. Using the method of least squares, a straight line is fitted to the data, which indicated no significant difference for easterly or westerly winds at any of the three locations: White Sands, Pacific Missile Range, or Atlantic Missile Range (now Air Force Eastern Test Range). The mean error between the regression line and the observed data is of the order of two meters per second. To improve the fit, a parabolic least squares fit was attempted, with a resultant mean error of approximately one meter per second. Further refinements are beyond the accuracies of the observations. Shorter period variabilities increase as the square root of the time up to approximately eight hours. For longer periods there is little increase with time. The deviations in the winds are investigated to determine the character of the variations, and the contributions of the eddies to the total kinetic energy are examined in the light of wind resistance. (Author)

AD-632 610 Fld. 4/2, 1/3
CFSTI Prices: HC $3.00 MF $0.75
AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO DEPUTY FOR FLIGHT TEST
PROJECT ROUGH RIDER, 1965, PHASE I - PHASE II.
Final summary rept. Apr-Aug 65,
by Edward Miller. Mar 66, 72p. Proj. AF-8620 (605),
ASD TR-66-3
Unclassified report

Descriptors: (*Thunderstorms, *Research aircraft), Meteorological phenomena, Storms, Penetration, Flight paths, Aircraft, Damage, Airborne, Meteorological instruments, Meteorological parameters, All-weather aviation

This report states the objectives of Project Rough Rider as well as discusses the test instrumentation used on the penetration F-100F aircraft. Other topics covered are flight operations, aircraft damage, location of archived data, and conclusions and recommendations for future thunderstorm penetrations. This report is documentary or historical in nature and gives an overall picture of Project Rough Rider 1965, but not a detailed analysis of the accumulated data. The various sources from which such analyses can be obtained are referenced in this report. (Author)

AD-632 212 See Fld. 7/4

Field 5-BEHAVIORAL AND SOCIAL SCIENCES

5/1. ADMINISTRATION AND MANAGEMENT

AD-631 974 Fld. 5/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
COMPUTERS IN THE RESEARCH ADMINISTRATIVE PROCESS.
Scientific rept.,
by Carl S. Jennings Jr., and William J. Price. 25 Apr 66, 41p. Rept. no. AFOSR-66-0653,
Unclassified report

See also AD-612 080.

Descriptors: (*Research program administration, *Computers), (*Management control systems, Automation), Data, Documentation, Air Force

The Air Force Office of Scientific Research of the Office of Aerospace Research established an automated Management Control Data System (MCDS) in 1962 which has been integrated into the organization line-management functions and is currently used in the management of basic research programs under AFOSR cognizance. A brief history of the origin of the AFOSR MCDS is presented along with administrative considerations and system design criteria which has led to the present configuration of the operational system. The AFOSR MCDS is described from management's point of view as opposed to the computer-system engineer's point of view, with emphasis on management concepts essential to successful automation of management processes. Management experience gained through four years of MCDS operation is reflected in the basic rules enumerated in the conclusion as essential to success of any automated management control data system. (Author)

AD-632 247 Fld. 5/1, 15/5
CFSTI Prices: HC $7.20 MF $2.00
PACIFIC MISSILE RANGE POINT MUGU CALIF
THE PERT CRITICAL-PATH COST SYSTEM.
Technical memo.,
by C. J. Thorne. 20 Apr 66, 420p. Rept. no. PMR-TM-66-3,
Unclassified report

Descriptors: (*Management planning, Costs), (*Guided missile ranges, Management planning), Weapon systems, Simulation, Laboratories, Diving, Mobile

A description is given of the PERT critical-path cost system and our experimental testing and evaluation of the IBM 7094 PERT Cost II program for potential Navy, Point Mugu use. Networks for two hardware projects, one management project, and a laboratory building project were successful. The experience gained through the use of PERT at PMR (Pacific Missile Range) indicates the following: (1) The PERT critical-path cost system for managing and allocating time and resources and evaluating performance should be established at PMR, by phasing it in, project by project. (2) Major and immediate improvement in planning and performance can be expected since this is the

common experience. (3) Many present managers are generally familiar with the PERT system. This, together with the available checked -out IBM PERT Cost II computer program, will save training, programming time and cost. (4) The effort will fail without the dedicated contributions of PERT analysts and experts; routine computer report processing, review, and expediting by a computer services group; estimates and progress reviews by the performing groups; management review and action at all levels based on these networks and reports. (Author)

AD-632 376 Fld. 5/1, 15/5
CFSTI Prices: HC $3.00 MF $0.50
DEPARTMENT OF DEFENSE WASHINGTON D C
GUIDE TO THE EVALUATION OF THE PERFORMANCE OF MAJOR DEVELOPMENT CONTRACTORS.
26 Jul 63, 56p.
Unclassified report

Descriptors: (*Research program administration, *Department of Defense), Effectiveness, Reports, Documentation, Scientific research, Handbooks

The handbook contains guidance in establishing the Department of Defense Program of Contractor Performance Evaluation. It also includes administrative procedures governing the preparation, processing and use of Contractor Performance Evaluation Reports. The purpose of the Defense Program of Contractor Performance Evaluation is to provide an orderly and uniform method of determining and recording the effectiveness of contractors in meeting their contractual commitments under contracts for engineering development and operational-systems development. The existence of this procedure will increase the importance to the contractor of satisfying his agreements in regard to cost, schedule and technical performance. The Program provides a long-term incentive to contractors by creating within the government a 'memory' of their performance and a means for considering this record in future actions relating to source selection.

AD-632 481 Fld. 5/1, 12/2, 5/2
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
SDC RESEARCH AND TECHNOLOGY DIVISION EXTERNAL PUBLICATIONS 1961 - 1965.
Technical memo.,
by C. Baum, and L. D. Wilhelm. 1 Mar 66, 24p.
Rept. no. TM-698/065/00,
Unclassified report

See also AD-612 955.

Descriptors: (*Operations research, Systems engineering), (*Systems engineering, Bibliographies), (*Data processing systems, Systems engineering), Artificial intelligence, Computational linguistics, Information retrieval, Programming (Computers), Information theory, Mathematics, Decision making, Education, Man-machine systems, Reports, Periodicals, Programming languages

The document presents a complete listing of external publications by SDC's Research and Technology Division staff members and consultants. The present issue lists journal publications, papers in conference proceedings, books, and book chapters for the years 1961-1965 inclusive, grouped in general according to subject matter. (Author)

AD-631 937 See Fld. 5/3

AD-632 054 See Fld. 12/2

AD-632 107 See Fld. 12/2

AD-632 211 See Fld. 15/3

AD-632 499 See Fld. 5/3

AD-632 524 See Fld. 5/10

5/2. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-632 017 Fld. 5/2, 15/7
CFSTI Prices: HC $4.60 MF $0.50
COMBAT OPERATIONS RESEARCH GROUP TECHNICAL OPERATIONS INC FORT BELVOIR VA
AN INFORMATION STORAGE AND RETRIEVAL SYSTEM FOR THE SPECIAL DOCTRINE AND EQUIPMENT GROUP.
Memo. rept.,
by Carlton Combs Jr., and John Flannagan. 11 Sep 62, 49p. Rept. no. CORG-M-159,
Contract DA-19-020-ORD-5351,
Unclassified report

Descriptors: (*Information retrieval, *Unconventional warfare), Punched cards

The paper describes a proposed Information Storage and Retrieval System developed for use by the Special Doctrine and Equipment Group, a subordinate command of the United States Army Combat Developments Command. The system consists of a Keysort card file indexing operation that allows SDEG personnel to record, store, abstract, and retrieve information pertinent to the operation of their Command. Cross-referencing of information is accomplished by punch-indexing the edges of a Keysort card specifically designed for SDEG use. (Author)

AD-632 052 Fld. 5/2
CFSTI Prices: HC $2.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
FIRST LETTER FREQUENCY OF RELATED TERM REFERENCES IN FOUR TECHNICAL THESAURI,
by Lawrence S. Papier, and Thomas T. Lin. Dec 65, 30p. Rept. no. CRDL-Special-Pub-5-12,
Unclassified report

Descriptors: (*Subject indexing, Dictionaries), Statistical analysis

The method was to compare the first letter frequencies in the thesauri with each other, with the first letter frequencies of their descriptors, and with the pattern noted by other investigators. The thesauri selected were The Engineers' Joint Council Thesaurus of Engineering Terms (EJC), the Defense Documentation Center's Thesaurus of Astia Descriptors (ASTIA), the Medical Subject Headings of the National Library of Medicine (MESH); and the Medical and Health Related Sciences Thesaurus of the Public Health Service (MHRST). The related terms did not follow the first letter frequency pattern of their own descriptors or of that reported in the literature. The principal difference was in redundancy of letters within their own letter section. The thesauri were fairly consistent in this difference. In addition to word redundancy, there seemed to be an additional factor resulting in the redundancy. (Author)

AD-632 181 Fld. 5/2, 9/2
HERNER AND CO WASHINGTON D C
SOME BASIC COMMENTS ON RETRIEVAL TESTING,
by Robert A. Fairthorne. Dec 65, 6p. Contract AF 49 (638)-1427, Proj. AF-9769,
AFOSR 66-0414
Unclassified report

Availability: Published in Journal of Documentation v21 n4 p267-70 Dec 1965. Copies to DDC users only.

Descriptors: (*Information retrieval, Test methods), Subject indexing, Vocabula y, Automatic

One should test only such performance as is necessary to the aim of the system. To define the aim is difficult, because we deal with essentially social systems. Necessary, but not sufficient, conditions can be established for performance. As knowledge grows, so will the conditions known to be necessary. To separate aim and achievement from the values of the aims and achievements, one must consider them in terms of documentation, not of the external applications or intentions. What matter are: what sort of documentary entities are asked for; how they are asked for; how well the system supplies what is asked for when it is asked for in these terms. A documentary system cannot substitute for an author or reader completely. Some ignorance is inevitable. The indexer cannot predict all the ways an item may legitimately interest a user, while the user cannot know his interests beforehand so precisely that he can state exactly what he wants and what he does not want. There are also the inevitable ambiguities of the indexing and request languages themselves. (Author)

AD-632 185 Fld. 5/2
MOORE SCHOOL OF ELECTRICAL ENGINEERING UNIV OF PENNSYLVANIA PHILADELPHIA
ESTABLISHMENT OF THE ACM REPOSITORY AND PRINCIPLES OF THE IR SYSTEM APPLIED TO ITS OPERATION,
by Morris Rubinoff, and John F. White Jr.. Jul 65, 8p. Contract AF 49 (638)-1421, Proj. AF-9769, Task 976901,
AFOSR 66-0011
Unclassified report

Availability: Published in Communications of the ACM v8 n10 p595-601 Oct 1965. Copies to DDC users only.

Descriptors: (*Data storage systems, *Information, retrieval), Documentation, Electrical engineering, Universities, Pennsylvania

The history of the establishment of the ACM Repository at the Moore School, U. of Pennsylvania, is reviewed briefly. The organizational and procedural plan for a mechanized information center has been based on two fundamental principles: (1) that information be made easily accessible to the customer, preferably on a self-serve basis, and (2) that the value of the services exceed user costs. The system is designed for remote teletypewriter on-line access to an information file in a 1301 disk storage which is auxiliary to the IBM 7040/ 1401 system at the university computer center. Significant features of the planned system include: (a) direct access via the console, (b) system storage of a complete description of itself in addition to document catalog and indexing data to enable users to design their own search strategies, (c) use of an unrestricted search vocabulary, (d) access through one or more of a large number of entry ports to enable adaptive man-machine interfacing with the indexing structure, and (e) stochastic type searching through related categories, sections, and classes of data. Thesauri and microthesauri are embedded in the system and kept dynamic and open -ended. The index terms have been generated primarily with regard to the document file rather than with regard to a philosophical partitioning of knowledge, and with a view to interests of potential users and the nature of future accessions. The collection primarily deals with computing machinery and programming languages. (Author)

AD-632 300 Fld. 5/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
PROCEEDINGS OF THE MILITARY LIBRARIANS' WORKSHOP (8TH) 14-16 OCTOBER 1964.
Oct 64, 42p.
Unclassified report

Descriptors: (*Libraries, Military organizations), Symposia, Department of Defense, Scientific research, Documentation, Reports, Control systems, Periodicals, India

Contents: Staff study; Panel discussions; Technical information support of the Department of Defense research and development program, by J. Heston Heald; Military librarians' workshop, by John F. Stearns; Librarians, East and West, by Harold Wooster.

AD-632 473 Fld. 5/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
THE BOLD (BIBLIOGRAPHIC ON-LINE DISPLAY) SYSTEM.
Professional paper,
by Howard P. Burnaugh. 6 Apr 66, 27p. Rept. no. SP-2338/000/01,
Unclassified report

See also AD-615 718.

Descriptors: (*Information retrieval, Real time), (*Bibliographies, *Display systems), Classification, Subject indexing, Computational linguistics, Programming (Computers), Magnetic tape, Teletype systems

The BOLD (Bibliographic On-Line Display) System serves as a general purpose vehicle for research on the components of a real-time retrieval system. Specific subjects for investigation are indexing, classification and categorizing schemes, file organization, and user-system communication. The program operates in a 'time-sharing' environment doing independent retrieval for multiple simultaneous usrs. A retrieval station may be any teletype connected to the time-sharing system. A station may be augmented with a CRT console and a light pen for rapid displaying of the retrieval information. Retrieval is effected by the specification of categories and/or retrieval phrases, using Boolean connectors. There are two modes for retrieval operation: the Browse mode and the Search mode. In the Browse mode the user may specify broad categories and retrieval terms and then browse through the retrieval information entry by entry. The user designates what information is to be returned. This may be anything that is defined in the data base, and may range from a single component (such as author, title, etc., for a bibliographic data set) to a complete body of text (i.e., abstract). (Author) (For presentation at the Third Annual Colloquium on Information Retrieval, Univ. of Pennsylvania, May 12-13, 1966)

AD-632 480 Fld. 5/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
SURF: SUPPORT OF USER RECORDS AND FILES, DESCRIPTION AND OPERATION.
Technical memo.,
by Everett M. Wallace. 29 Apr 66, 35p. Rept. no. TM-2912/000/00,
Unclassified report

See also AD-443 751.

Descriptors: (*Documentation, Programming (Computers)), (*Records, Subject indexing), (*Management control systems, Records), Input-output devices, Indexes, Data processing systems, Instruction manuals

SURF is an EDP-based service for Support of User Records and Files. SURF is designed to meet, or be adapted to, a variety of unique requirements fulfilling the needs of individuals in organizing, maintaining and finding what is in their personal files, without extensive reprogramming for unusual or special demands. It is programmed in SDC's MADAM language which is implemented for an 8K IBM 1401, or IBM 360/30 with 1401 emulator. This document describes SURF routines and associated operational requirements in detail sufficient for using the programs. Included are a summary of the history and purpose of SURF development. SURF usage, and a functional description of inputs, outputs and processes. Three appendices present complete listings of instructions for each routine, examples of the variety of inputs and outputs required by different SDC users, and operational instructions to keypunch and machine operators. (Author)

AD-632 551 Fld. 5/2, 9/2
CFSTI Prices: HC $1.10 MF $0.50
ITEK CORP LEXINGTON MASS INFORMATION SCIENCES LAB
AUTOMATING CATALOGING FUNCTIONS IN CONVENTIONAL LIBRARIES.
Technical rept.,
by Paul J. Fasana. 15 Apr 63, 20p. Rept. no. ISL-9028-37,
Contract AF 19 (604)-8438,
Unclassified report

See also AD-613 337.

Descriptors: (*Libraries, Automation), Subject indexing

Partial automation of processing functions has been achieved. A tape typewriter creates machine-interpretable bibliographic records, which are then processed on a specially designed digital processor, called the Crossfiler. This device makes use of a machine-interpretable natural format, which is a variable field, multilevel, sequential format, using natural text delimiters as machine-interpretable boundary codes. In printout, the Library of Congress format is simulated. The system is presently being implemented in a large Air Force library. (Author)

AD-632 587 Fld. 5/2, 9/2
CFSTI Prices: MF $2.25
MITRE CORP BEDFORD MASS
PROCEEDINGS OF THE CONGRESS ON THE INFORMATION SYSTEM SCIENCES (2D).
Mar 66, 508p. Contract AF 19 (628)-2390, ESD TR-65-366
Unclassified report

Availability: Spartan Books, Inc., 1250 Connecticut Avenue, N. W. Washington, D. C. $23.75.

Descriptors: (*Data processing systems, Symposia), Command + control systems, Programming languages, Information retrieval, Management planning, Design, Technical information centers, Man-machine systems, Decision making, Graphics, Subject indexing, Computers, Costs, Films, Behavior, Scientific personnel, Engineering personnel, Adaptive systems, Linguistics, Transformational grammars

The papers formed the basis for discussion in sixteen technical sessions at the Second Congress on the Information System Sciences (Nov 1964). The Congresses, now established as biennial events, were formed to increase communication among scientists, engineers, and military personnel in the technology of information systems.

AD-632 600 Fld. 5/2
CFSTI Prices: HC $3.00 MF $0.50
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
DDC DESCRIPTOR FREQUENCIES,
by Paul H. Klingbiel, and Charles R. Jacobs. May 66, 53p.
Unclassified report

Descriptors: (*Documentation, *Subject indexing), Information retrieval, Handbooks, Data

This publication summarizes the frequency of use of the 7144 descriptors currently authorized for indexing technical reports in the AD collection. The descriptors are arranged alphabetically in the first section and by frequency in the second section. The frequency data cover about 427,000 AD documents spanning the interval from March 1953 through March 1966. (Author)

AD-632 481 See Fld. 5/1

5/3. ECONOMICS

AD-631 937 Fld. 5/3, 5/1, 12/2
CFSTI Prices: HC $2.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
ON INFORMATION ECONOMICS AND AGGREGATE PLANNING DECISIONS.
Management sciences research rept.,
by Charles H. Kriebel. Mar 66, 27p. Rept. no. MSRR-68,
Contract Nonr-760 (24), Proj. NR-047-048,
Unclassified report

Descriptors: (*Decision theory, Management planning), (*Production control, Decision theory), (*Economics, Information theory), Scheduling

Marschak and Radner have shown that a useful framework for evaluating information within organizations is the construct of team decision theory. Radner develops team decision models for the case where organizational objective criteria are represented by a quadratic function. It is clear that this study bears directly on the analysis of optimal decision rules for aggregate planning, as reported by Holt, Theil, Van de Panne, and others. The purpose of this note is to relate these analyses explicitly and to provide a numerical example based on aggregate production planning decisions. Some practical considerations for the design of economic decision and information systems are discussed more fully in a future work.

AD-631 943 Fld. 5/3, 12/2
CFSTI Prices: HC $2.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
COMPUTATION OF EXPANSION RATES FOR THE GENERALIZED VON NEUMANN MODEL OF AN EXPANDING ECONOMY.
Management sciences research rept.,
by Michael J. Hamburger, Gerald L. Thompson, and Roman L. Weil,Jr.. Jan 66, 38p. Rept. no. MSRR-63,
Contract Nonr-760 (24), Proj. NR-047-048,
Unclassified report

Descriptors: (*Economics, Operations research), Industrial production, Game theory, Linear programming, Search theory, Mathematical models, Algorithms, Costs, History, Industries

The first part of the paper is a theoretical study of v (B - alpha A) considered as a function of alpha, the expansion factor, where A and B are the input and output matrices of the model. Then a simple search algorithm is presented for computing the maximum and minimum expansion rates of the model. The algorithm uses the simplex method of linear programming as its basic subroutine. For a typical set of data, an expansion rate can be found to sufficient accuracy by solving 14 or fewer linear programming problems. With modern computers this is not a difficult task. The last part of the paper discusses the available data, in this case, input-output data, and gives the computational results found using it. Limitations of the data and conclusions drawn from it are discussed. The use of the model for economic planning and evaluation is considered. (Author)

AD-631 947 Fld. 5/3
CFSTI Prices: HC $2.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
MARKET VERSUS BEHAVIORAL THEORIES OF THE FIRM AND BASIC MANAGERIAL RESEARCH.

Management sciences research rept.,
by Andrew C. Stedry. Apr 66, 33p. Rept. no. MSRR-70,
Contract Nonr-760 (24), Proj. NR-047-048,
Unclassified report

Presented at the University of Illinois Symposium on Production Economics in Agricultural Research, March 8-10, 1966.

Descriptors: (*Economics, Theory), (*Industries, Management planning), Industrial production, Behavior, Decision making, Optimization, Commerce, Management control systems

The basic elements of the market (or economic) theory of the firm and the behavioral theory of the firm are presented. The contributions of each to understanding, prediction, and explanation of micro and macroeconomic theory are discussed briefly. The major focus is on prescriptive models for managerial decision making and the contributions that each theory has made toward progress in this area. Future possibilities for combining the elements of the two theories to improve prescriptive management models are suggested. (Author)

AD-632 055 Fld. 5/3
RAND CORP SANTA MONICA CALIF
BOOK REVIEW OF 'THE DEVELOPMENT OF SOCIAL OVERHEAD CAPITAL IN INDIA, 1950-60', BY J. M. HEALEY,
by George Rosen. Apr 66, 5p. Rept. no. P-3351,
Unclassified report

Descriptors: (*India, *Economics), Reviews, Money, Costs, Irrigation systems, Political science

AD-632 165 Fld. 5/3, 5/4
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
FOREIGN INVESTMENT IN INDIA,
by George Rosen. Apr 66, 7p. Rept. no. P-3353,
Unclassified report

Book Review: Michael Kidron, Oxford University Press, London, 1965, pp XVI, 368, 50 sh.

Descriptors: (*India, Foreign policy), (*Foreign policy, Economics), (*Economics, Bargaining), Reviews, Foreign aid

AD-632 495 Fld. 5/3, 12/2
CFSTI Prices: HC $2.00 MF $0.50
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ON OPTIMAL DEVELOPMENT IN A MULTI-SECTOR ECONOMY.
Research rept.,
by David Gale. Apr 66, 44p. Rept. no. ORC-66-11,
Contract Nonr-222 (83), Proj. NR-047-033,RR-003-07-01
Unclassified report

Descriptors: (*Economics, Optimization), (*Dynamic programming, Economics), Labor, Production, Industries

An economy is considered that has n goods and k types of labor, each of which is growing at the same constant rate. Goods are produced from labor and other goods by a set of specified activities. Given an initial supply of goods and amounts of labor, all possible production programs running from the present time to infinity through discrete time periods are considered. With each program is associated a utility sequence measuring the satisfaction achieved by the program at each period of time. A program is optimal if its utility sequence overtakes all other such sequences. The paper is devoted to proving the existence of optimal programs for a wide class of economies and to deriving the properties of such programs. In particular it is shown that the optimal program approaches a certain balanced program. Essential use is made of the existence of an infinite sequence of optimal prices with respect to which the optimal program is one which maximizes the sum of profit and utility at each time period. (Author)

AD-632 499 Fld. 5/3, 12/2, 5/1
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
MODELS FOR HIERARCHIAL DECISIONS INVOLVING INVENTORIES,
by Karl Borch. Sep 65, 15p. Rept. no. WMSI Reprint-31,
Unclassified report

Availability: Published in Journal of the Academy of Management v8 n3 p179-89 September 1965. Copies to DDC users only.

Descriptors: (*Inventory control, Decision making), Game theory, Production, Distribution (Economics), Game theory, Decision theory

Models that facilitate analysis of decision making in hierarchial systems, for example involving wholesalers and retailers, can ultimately be of significance not only to academic people concerned with economics, distribution and production but to others as well. The whole idea of a hierarchy of interdependent decision processes within a system may be more realistic for many purposes than some of the more widespread single decision concepts. The focus on inventory decisions, as one class of a potentially larger species, provides both a tangible beginning and a problem area where some mathematical work has been done. The purpose is to explain a relatively single model as a means of establishing the need for theory in this area and the potentially useful though unexplored generalizations from this model. (Author)

AD-632 193 See Fld. 12/1

AD-632 235 See Fld. 5/11

AD-632 270 See Fld. 13/6

AD-632 532 See Fld. 17/2

5/4. HISTORY, LAW AND POLITICAL SCIENCE

AD-632 163 Fld. 5/4
CFSTI Prices: HC $3.60 MF $0.50
RAND CORP SANTA MONICA CALIF
GERMANY, THE CONTINUING CHALLENGE,
by Hans Speier. Apr 66, 37p. Rept. no. P-3355,
Unclassified report

Presented at the University of Texas public lecture series March 15, 1966.

Descriptors: (*West Germany, History), (*East Germany, History), Europe, USSR, United States Government, Foreign policy, Western Europe, Vietnam, Political science, France

To date, more than twenty years after the end of military hostilities in World War II, there is no stable order in Europe. None has existed since the end of World War I. The American presence in Western Europe, established after the end of World War II helped to safeguard peace and order in Europe, but peace has never been completely assured and hence order never been stable. The symbol of Europe's instability has been the division of the continent with divided Germany in its midst. While DeGaulle may have succeeded in ringing down the curtain on a period of post-war history, it may be doubted that he has taken a constructive step toward achieving political order in Europe. (Author)

AD-632 225 Fld. 5/4
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE SOVIET UNION AND ARMS CONTROL,
by Thomas W. Wolfe. Apr 66, 41p. Rept. no. P-3337,
Unclassified report

Descriptors: (*Arms control, USSR), Limited war, Disarmament, Nuclear warfare, Nuclear weapons, Warfare, China, United States Government, Vietnam, History

The primary purpose of the paper is to provide a frame of reference in which the subjects of arms control, limited war, and peacekeeping may be related to both current Soviet disarmament policy and to wider questions of the Soviet Union's aims and behavior on the international scene. The Soviet Union at best is moving only slowly and grudgingly toward acceptance of the on-going system of 'normal' competitive striving among national states. The prospects for the future will not greatly improve until the Soviet leadership is more fully persuaded that the time has come to lay down its messianic burdens and get on with the business of satisfying the needs and inner aspirations of the society over which it rules. In that event, the Soviet rulers may come increasingly to perceive that Soviet security and economic well-being can be better served by seeking broader areas of cooperation with the United States, rather than acting upon the assumption that the policies of the Soviet Union and its chief Western adversary are grounded upon an irreconcilable clash of interests.

AD-632 165 See Fld. 5/3

AD-632 235 See Fld. 5/11

5/5. HUMAN FACTORS ENGINEERING

AD-632 241 Fld. 5/5, 6/14
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
ANTHROPOMETRY OF COMMON WORKING POSITIONS.
Final rept., Jul 61-Jul 62,
by Milton Alexander, and Charles E. Clauser.
Dec 65, 31p. Rept. no. AMRL-TR-65-73,
Proj. AF-7184, Task 718408,
Unclassified report

Descriptors: (*Anthropometry, *Posture), (*Human engineering, Guided missile personnel), Photogrammetry, Measurement

Twenty-six dimensions of the human body in various working positions (standing, bending, kneeling, squatting, supine, and sitting) were obtained by photography or by direct measurement. The purpose of the study was to provide the human engineer with anthropometric data of various missile worker's positions so that more adequate work stations can be designed. Each dimension is defined verbally and graphically; and the 5th, 25th, 50th, 75th, and 95th percentiles and other statistical data are presented. (Author)

AD-632 076 See Fld. 9/2

AD-632 254 See Fld. 5/10

5/6. HUMANITIES

AD-632 476 Fld. 5/6, 5/11
CFSTI Prices: HC $3.00 MF $0.75
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
THE SOCIAL CONSCIENCE OF THE CHRISTIAN SOUTH.
Professional paper,
by James H. Kirk. 30 Apr 66, 83p. Rept. no. SP-2108,
Unclassified report

Descriptors: (*Religion, United States), (*Sociology, Religion), History, Political science,

Economics, Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia

Surveys the historical development as well as the physical and organizational structures of the various religious bodies predominant in the South East region composed of eleven states. Illustrates the pattern of religion in the South East by statistical material showing the presence and prevalence of predominant religious groups, their strength and growth. Analyzes the influence of religion on the political, economic, and cultural structure of this area, as well as the influence of political, economic, cultural and other factors on the religions. (Author)

5/7. LINGUISTICS

AD-631 861 Fld. 5/7
CFSTI Prices: HC $2.00 MF $0.50
HEBREW UNIV JERUSALEM (ISRAEL) APPLIED LOGIC BRANCH
THE NOMINAL PHRASE IN MODERN HEBREW. PART I. INTRODUCTION AND ARTICLE.
Technical rept.,
by Uzzi Ornan. May 65, 41p. Rept. no. TR-18,
Contract N62558-3882, Proj. NR-049-130,
Unclassified report

Descriptors: (*Languages, Analysis), Grammars, Syntax, Transformational grammars, Israel

Contents (The first two chapters of a doctoral dissertation in Hebrew, a revised version to be published in English): Introduction and Articles.

AD-631 862 Fld. 5/7
CFSTI Prices: HC $1.00 MF $0.50
HEBREW UNIV JERUSALEM (ISRAEL)
THE EQUIVALENCE OF CONTEXT-FREE PHRASE STRUCTURE GRAMMARS AND CATEGORIAL GRAMMARS.
Technical rept.,
by Haim Gaifman. Jul 65, 22p. Rept. no. TR-19,
Contract N62258-3882, Proj. NR-049 130,
Unclassified report

Descriptors: (*Context free grammars, Theory), Grammars, Automata, Theory, Israel

Proof of a theorem by Gaifman stating that context free phrase structure grammars are equivalent to categorial grammars. An effective way, to find an equivalent grammar of one sort when a grammar of the other sort is given, is presented. (Author)

AD-632 569 Fld. 5/7, 9/2, 9/4
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
A NOTE ON COMPUTING TIME FOR RECOGNITION OF LANGUAGES GENERATED BY LINEAR GRAMMARS,
by Tadao Kasami. Apr 66, 13p. Rept. no. R-287,
Contract DA-28-043-AMC-00073 (E),NSF-GK-690 Proj. 20014501B31F,
Unclassified report

See also AD-626 733.

Descriptors: (*Computational linguistics, Time), Computers, Automata, Grammars, Linear systems, Magnetic tape

It is shown that (1) there exists a language L sub 0 which is generated by a linear grammar and is not T (n)-recognizable by any on-line multi-tape Turing machine if lim T (n)/ (n/logn) squared (as n approaches infinity) equals zero and (2) any language generated by a linear grammar is n squared-recognizable by an on-line single-tape Turing machine in the sense of Hartmanis and Stearns (Computational complexity of recursive sequences, Proc. the Fifth Annual Symp. of Switching Circuit Theory and Logical Design, p. 82-90 (1964)). (Author)

AD-632 108 **See Fld. 17/2**

5/8. MAN-MACHINE RELATIONS

AD-632 254 **See Fld. 5/10**

AD-632 477 **See Fld. 9/2**

5/9. PERSONNEL SELECTION, TRAINING AND EVALUATION

AD-631 980 Fld. 5/9, 5/11
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
CHANGE IN SOCIOMETRIC STATUS DURING MILITARY BASIC TRAINING RELATED TO PERFORMANCE TWO YEARS LATER,
by Paul D. Nelson, and Newell H. Berry. 29 Oct 65, 8p. Rept. no. 66-2,
NAVMED MF022.01.04-9001
Unclassified report

Availability: Published in The Journal of Psychology v61 p251-5 1965. Copies to DDC users only.

Descriptors: (*Naval training, Performance (Human)), (*Sociometrics, Naval training), Military training, Marine Corp, Psychometrics, Behavior, Selection, Effectiveness

In a sample of male enlisted marines, peer nominations obtained during the second and tenth weeks of basic training were analyzed in relation to two-year performance measures of military conduct and proficiency. The primary purpose of the study was to ascertain the extent to which change in sociometric status during training might be of value as a predictor of posttraining behavior. Change in status, inferred to be a measure of individual development during training, was significantly related to proficiency but not uniquely to military conduct. Peer evaluations obtained early were as valid as those obtained later in training when prediction was made to two-year conduct. On the other hand, the validity of peer evaluations with technical proficiency appears to increase as the training period unfolds. (Author)

AD-631 984 Fld. 5/9
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
SOCIO-ECONOMIC STATUS AND NAVY OCCUPATIONS,
by E. K. Eric Gunderson, and Paul D. Nelson.
Nov 65, 7p. Rept. no. 65-1,
NAVMED MF022.01.03.9001
Unclassified report

Availability: Published in Personnel and Guidance Journal p263-6 Nov 1965. Copies to DDC users only.

Descriptors: (*Sociometrics, Naval personnel), (*Naval personnel, Job analysis), Economics, Correlation techniques, Selection, Decision making, Officer personnel, Background

The relationship of parents' socio-economic status to Navy occupation was determined for 1,060 naval personnel in 16 occupational categories. Officers were significantly higher on the socio-economic index than enlisted men, and when Navy enlisted rates (jobs) were grouped into 2 broad categories, white-collar and blue-collar, the white-collar group scored significantly higher on the index than the blue-collar. The observed differences in socio-economic background among Navy occupational groups suggests possible concomitant variations in value systems, achievement strivings, and personality disorders. (Author)

AD-631 986 Fld. 5/9, 6/5, 5/10
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
PROMOTION AND MENTAL ILLNESS IN THE NAVY,
by Ransom J. Arthur, and E. K. Eric Gunderson.
Sep 65, 9p. Rept. no. 65-8,
NAVMED MF-022.03-9002
Unclassified report

Availability: Published in Journal of Occupational Medicine v7 n9 p452-6 Sep 1965. Copies to DDC users only.

Descriptors: (*Naval personnel, Mental disorders), (*Mental disorders, Job analysis), (*Wages, Naval personnel), Military medicine, Correlation techniques, Antarctic regions, Navy, Naval training

The study compares the promotional attainments of 2,939 enlistedmen in pay grades E-4, E-5, and E-6 (third-class petty officer, second-class petty officer, and first-class petty officer, respectively) who were admitted to naval hospitals for mental illness over a 2-year period with those of Navy enlistedmen generally and those of men selected for special assignments in the Antarctic. Results indicated that the hospitalized psychiatric patients were significantly retarded in their promotion rate in the naval service, and it was inferred that mental ill health was incompatible with either routine or rapid advancement in the Navy occupational structure. Differences were found among 4 major diagnostic groups in promotional retardation and in probability of restoration to military duty. Possible factors accounting for the relationship between retardation in promotion and hospitalization for mental illness are discussed, and the need for longitudinal studies to reveal the complex etiology of mental illness in the military service is emphasized. (Author)

AD-632 155 Fld. 5/9
CFSTI Prices: HC $2.60 MF $0.50
RAND CORP SANTA MONICA CALIF
SOME ASPECTS OF THE ALLOCATION OF SCIENTIFIC EFFORT BETWEEN TEACHING AND RESEARCH,
by Michael L. Intriligator, and Bruce L. R. Smith.
Mar 66, 28p. Rept. no. RM-4339-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Scientific personnel, Distribution), (*Personnel management, Scientific personnel), Scientific research, Education, Instructors, Economics, Management planning, Functional analysis, Time

The study considers some aspects of the allocation of scientific effort by means of an analytic framework consisting of specified policy objectives and a model for the allocation of new Ph.Ds in science between teaching and research. Some simplifying assumptions lead to a general welfare function for this aspect of a national science policy. The production of new scientists is determined in the model by a production function, dependent on teaching scientists and on time. For any of the special cases of the welfare function and for a production function with a constant ratio of new scientists to teaching scientists, an initial allocation of a maximum proportion of new scientists to teaching is preferred, followed by a switch to a minimum proportion of new scientists to teaching. Similar 'switching' solutions also apply to a wider class of objectives and production functions. The analytic framework and preferred allocations are briefly examined with respect to 'real world' considerations and to their possible implications for national policy. Several policy initiatives are discussed in light of the model and some possible changes are suggested in government policies on R and D support and aid to science education. (Author)

AD-632 182 Fld. 5/9, 5/10
CFSTI Prices: HC $2.00 MF $0.50
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX

ESTIMATING READING ABILITY LEVEL FROM THE AQE GENERAL APTITUDE INDEX,
by Howard L. Madden, and Ernest C. Tupes.
Feb 66, 36p. Rept. no. PRL-TR-66-1,
Proj. AF-7717, Task 771705,
Unclassified report

Descriptors: (*Reading, Aptitude tests), (*Air force personnel, Aptitude tests), Distribution, Job analysis, Psychometrics, Correlation techniques

Conversion tables are presented for estimating reading achievement (reading grade level as measured by the California Achievement Test and scaled score as measured by the Davis Reading Test) from the AQE General Aptitude Index. Distributions of estimated reading grade are shown for non-prior-service airmen entering the Air Force in 1964 and 1965 for the total group and for subgroups split on years of education completed. Distributions of estimated reading grade are also presented by career field for airmen assigned to 29 career fields. It was pointed out that a wide range of reading ability was found within each career field and that the career fields differed considerably with respect to average reading ability. Implications for writing of Career Development Courses and technical manuals were discussed. (Author)

AD-632 188 Fld. 5/9
CFSTI Prices: HC $11.60 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
TEACHING MACHINES AND PROGRAMMED INSTRUCTION - SOME FACTORS TO CONSIDER IN IMPLEMENTATION.
Research memo.,
by Robert G. Smith,Jr.. Aug 61, 120p.
Unclassified report

Descriptors: (*Teaching machines, Military training), (*Programmed instruction, Military training), Programming (Computers), Costs, Air Force personnel, Air Force training, Students

The purpose of the paper is to provide general guidance and information to commanders and their staffs who may be interested in considering the use of automated instruction in their training programs. The paper attempts to develop an appreciation of what is involved in automating instruction, but does not present material designed to describe in detail how to automate instruction. (Author)

AD-632 189 Fld. 5/9
CFSTI Prices: HC $7.60 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
EFFECTS OF TRAINING RESPONSE MODE, TEST FORM, AND MEASURE ON ACQUISITION OF SEMI-ORDERED FACTUAL MATERIALS.
Research memo.,
by Joseph F. Follettie. Apr 61, 72p. Rept. no. Hum RR0-24,
Unclassified report

Descriptors: (*Teaching methods, Effectiveness), (*Military training, Teaching methods), Retention, Teaching machines, Learning, Military personnel, Textbooks, Statistical data, Statistical analysis

Findings suggest no difference between live and taped lecture, a significant advantage of read material over heard material, a significant advantage of self-paced reading over class-paced reading, and a significant advantage of the plain book format over the scrambled book format. Results also suggest that recognition from tests based on neorote contents might be used in lieu of recall form tests in that there is a generally stable relationship between the two test forms. The research was undertaken to find a modified scrambled book treatment which would show up as well as a plain book treatment. The search was unsuccessful. (Author)

AD-632 462 Fld. 5/9
CFSTI Prices: HC $6.00 MF $1.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
ANALYSIS OF INSTRUCTIONAL SYSTEMS.
Final rept. (technical memo.),
by John F. Cogswell, J. E. Bratten, R. E. Egbert, D. P. Estavan, and F. A. Yett. 19 Apr 66, 267p. Rept. no. TM-1493/201/00,
Unclassified report

Rept. on New Solutions to Implementing Instructional Media through Analysis and Simulation of School Organization. See also AD-427 752, AD-436 528, AD-620 663, PB-167 675, PB-169 043.

Descriptors: (*Education, *Teaching machines), (*Programmed instruction, Analysis), Computers, Students, Models (Simulations), Programming (Computers), Data processing systems, Automation, Scheduling, Simulation, Learning, Systems engineering

The major findings include the identification of two ways for using system analysis in education, the specification of procedures for conducting analyses of instructional systems, and implications for school organization. Although there is a definite trend in secondary education to search out and introduce ways to alter school organizations so that the individual differences among students can be accommodated, no school has yet evolved an organization to successfully meet this objective. Schools striving in this direction are presently blocked because they lack two major resources: (1) adequate self-study instructional materials, and (2) adequate systems to provide information to instructors, counselors, and administrators about the status of students as individuals. Recommendations for attacking these problems growing out of the study include: (1) continued development of the computer -based system to assist students and counselors in academic planning that was started in the project; (2) continued study of the use of information processing in the classroom to design systems that will collect, store, and display student information so that it can be used in the immediate instructional process; (3) in-service training of influential school personnel in the skills of designing individualized course materials; and (4) development and dissemination of procedures for the management of changes in schools. (Author)

AD-632 490 Fld. 5/9
CFSTI Prices: HC $10.60 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
THE DEVELOPMENT OF TRAINING PROGRAMS FOR FIRST ENLISTMENT REPAIRMEN: I. HOW TO DEFINE TRAINING OBJECTIVES.
Research memo.,
by Arthur J. Hoehn, and Andrew H. McClure.
Jul 60, 108p. Contract DA-44-188-ARO-2,
Unclassified report

Descriptors: (*Maintenance personnel, Army training), Army personnel, Training devices, Recruiting, Job analysis, Electronic equipment, Military requirements, Performance (Human), Costs

The proposal is made that training objectives take the form of detailed specifications of the performance capabilities which the training is to produce. In school courses for repairmen this means that the statement of objectives should clearly specify what a man must be able to do to be ready for assignment to the field. The practical utility of this concept depends on the availability of a method for implementing it. One approach to the formulation of performance objectives is described in this report. Detailed guidance is given on the procedures involved; and, for illustrative purposes, the complete process is applied to the derivation of training objectives for one MOS (MOS 294, Field Carrier Equipment Repairman). The proposed method must, for the present, be evaluated largely on logical grounds. However, the ultimate test of the method is the extent to which it facilitates the design of effective, economical training programs. (Author)

AD-632 494 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
INTERIM BIBLIOGRAPHY OF PUBLICATIONS, 1 JULY TO 31 DECEMBER 1965.
Feb 66, 14p. Contract DA-44-188-ARO-2,
Unclassified report

Descriptors: (*Training, Bibliographies), (*Military training, Bibliographies), Guided missile personnel, Military personnel, Human engineering, Military intelligence, Performance (Human), Education, Weapon systems, Navigation, Electronics, Maintenance, Abstracts

The bibliography includes publications, professional presentations, and research by-products.

AD-632 497 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
SELECTION FOR ANTARCTIC SERVICE.
Interim rept.,
by E. K. Eric Gunderson. Mar 66, 22p. Rept. no. 66-15,
NAVMED MF-022.01.03-9001
Unclassified report

Descriptors: (*Naval personnel, Selection), (*Antarctic regions, Naval personnel), Job analysis, Confined environments, Psychometrics, Stress (Psychology), Adaptation (Physiology), Performance (Human), Personality, Motivation, Attitudes, Leadership, Social psychology

Environmental conditions, group composition, and work roles at Antarctic scientific stations are described, and possible sources and effects of stress in these environments are indicated. Cultural and psychological characteristics of various Navy and civilian occupational groups represented in wintering-over parties are compared, and the selection problem and procedures are outlined. Personal history, clinical, and self description variables which correlated significantly with three performance criteria are presented for Navy enlisted and 'Seabee' groups, providing a summary of characteristics that distinguish the successful Navy man at small Antarctic stations. (Author)

AD-632 568 Fld. 5/9
CFSTI Prices: HC $5.60 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
PROGRAMMED INSTRUCTION: A PLAN OF RESEARCH.
Research memo.,
by Thomas J. McCrystal. May 61, 51p.
Unclassified report

Descriptors: (*Programmed instruction, Scientific research), Students, Training devices, Display systems, Teaching machines

Contents: Elements of programmed instruction. Summary of previous investigations: Investigations of program step size, investigations of pacing, investigations of prompting, investigations of response modes, investigations of feedback, investi-

gations of explanations. Program variables available for study: Step-associated variables, prompting and cueing variables, response -related variables, feedback and reinforcement variables, program configuration variables. Programmed instruction research apparatus.

AD-632 609 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.50
ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS DECISION SCIENCES LAB
DIRECT VS INDIRECT ASSESSMENT OF SIMPLE KNOWLEDGE STRUCTURES.
Technical rept. May 64-Jan 65,
by H. Edward Massengill, and Emir H. Shuford,Jr.. Mar 66, 55p. Proj. AF-2806, Task 280609,
ESD TR-65-542

Unclassified report

Descriptors: (*Education, Test methods), Decision making, Performance (Human), Programmed instruction, Cost effectiveness, Probability, Instructors, Mathematical analysis

The report compares two types of classroom testing in terms of efficacy in guiding instruction. One type of testing is the traditional indirect method based on the observation of choices. The other type is the direct method based on admissible probability measurement. The general finding is that the direct methods always perform as well as and in most cases better than the indirect methods. This deficiency in the indirect method can be alleviated in theory by introducing redundancy into the test and asking the same question over and over again. The performance of indirect methods depends in a very critical manner upon the information available to the instructor from other sources about the current state of knowledge of each student. The performance of the direct methods is unaffected by this. The gain in effectiveness achieved by using direct methods must be balanced off against the cost of using these new methods. A direct method may require more student time per item than does an indirect method. This, however, may be more than compensated for by the requirement for redundancy when using the indirect method. In addition, since a direct method does not require additional information from the instructor as to the current state of knowledge of each student, the possibility exists that much larger classes may be taught with no loss in effectiveness thus implying even further economic benefits from the use of direct methods to guide classroom instruction. (Author)

AD-631 840 **See Fld. 5/10**

AD-632 060 **See Fld. 5/10**

AD-632 358 **See Fld. 5/10**

AD-632 505 **See Fld. 5/10**

AD-632 558 **See Fld. 9/2**

AD-632 571 **See Fld. 5/10**

5/10. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-631 840 Fld. 5/10, 6/16, 5/9
CFSTI Prices: HC $3.00 MF $0.75
NAVAL TRAINING DEVICE CENTER PORT WASHINGTON N Y
THE EFFECTS OF INDUCED MUSCLE TENSION AND AUDITORY STIMULATION ON TACHISTOSCOPIC PERCEPTION,
by John L. Andreassi. Mar 66, 65p. Rept. no. NAVTRADEVCEN-IH-49,

Unclassified report

Descriptors: (*Perception, Tachistoscopes), (*Muscles, Contraction), (*Hearing, Stimulation), (*Visual perception, Psychophysiology), Factor analysis, Nervous system, Geometric forms, Performance tests, Noise

The effect of accessory stimulation upon tachistoscopic perception of geometric figures was studied. In Experiment I, 32 subjects were tested on two successive days in a complete factorial design (Subjects x Treatments) in which degree of induced muscle tension (IMT) and level of task difficulty were manipulated. An IMT level of 1/2 of maximum resulted in significantly ($p<.01$) improved visual perception. In Experiment II artificial pupils were employed to test the hypothesis that improved performance was due to pupil dilation. Eight subjects from Experiment I were tested on five successive days and performance at 1/2 of maximum IMT was again significantly ($p<.05$) improved, thus precluding pupil dilation as the reason for the results obtained in Experiment I. In Experiment II performance at the middle level of task difficulty benefited significantly ($p<.05$) from IMT. Experiment III investigated the effects of four levels of auditory stimulation (white noise) on tachistoscopic perception in a new group of 32 subjects. Perception was significantly ($p<.05$) improved with the 1/4 of maximum noise level at the easiest level of difficulty. Results were interpreted within the framework of the activation concept. Recent neurophysiological data point to the ascending reticular activating system as a possible mediator which could influence cortical and retinal areas in the facilitation of tasks such as tachistoscopic perception. (Author)

AD-631 874 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONACA CALIF
TEMPORAL FACTORS IN SUBJECTIVE COLOR,
by J. J. Sheppard,Jr.. Mar 66, 43p. Rept. no. rm-4770-ARPA,
Contract SD-79,

Unclassified report

Descriptors: (*Colors, *Visual perception), Time, Analysis of variance, Human engineering, Psychophysiology, Sensation (Physiology), Color vision

The Memorandum provides a synopsis of what is known about subjective-color sensations produced by temporal factors in the retinal luminous stimulus. Four principal psychophysical phenomena or effects involved in subjective color are identified and discussed. The Prevost-Fechner -Benham Effect refers essentially to the evocation of a color sensation that differs when the visual stimuli are presented intermittently rather than continuously. The Broca-Sulzer-Pieron Effect concerns the variations of color sensations with time. The Brucke-Bartley Effect refers to the enhanced brightness of visual stimuli when presented intermittently rather than continuously. The disappearance of visual sensation when the retinal image is artificially stabilized so that it falls continuously on the same receptors is termed the Ditchburn-Ratliff Effect. The use of the Prevost-Fechner-Benham Effect to obtain colored images on black-and-white television receivers is discussed to illustrate one technological application of subjective color. An unexpected appearance of the Prevost-Fechner-Benham Effect in a visual experiment is discussed to emphasize the dangers involved in a failure to consider subjective-color effects during the design of man-machine systems utilizing human visual characteristics. (Author)

AD-632 013 Fld. 5/10
ISRAEL INST OF APPLIED SOCIAL RESEARCH JERUSALEM
DYADIC INTERACTION: THEORY AND EXPERIMENT,
by Uriel G. Foa. 1961, 6p. Contract AF 61 (052)-121,

Unclassified report

Availability: Published in Acta Psychologica v19 p467-8 1961. Copies to DDC users only.

Descriptors: (*Behavior, Social psychology), Perception (Psychology), Emotions, Personality, Theory, Israel

The report outlines a program of theoretical and empirical research dealing with social learning in the dyad, which attempts to describe and predict how the behavior of a person changes as the result of his interaction with another person. Some of the problems investigated are (1) The development of systematic categories or a conceptual structure for the classification of interpersonal behavior; (2) The provision of a metatheory--the contiguity principle--for predicting empirical results from the conceptual structure; (3) The analysis of the interpersonal structure; (4) The relation of behavioral to interpersonal structures.

AD-632 060 Fld. 5/10, 5/9
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
THE PREDICTIBILITY OF CLINICIANS' EVALUATIONS FROM BIOGRAPHICAL DATA,
by E. K. E. Gunderson, and E. L. Kapfer. Apr 66, 10p. Rept. no. 65-10,
NAVNED MR005.12-2004-1

Unclassified report

Availability: Published in Journal of Clinical Psychology v22 n2 p144-50 Apr 1966. Copies to DDC users only.

Descriptors: (*Antarctic regions, Personnel), (*Psychometrics, Personnel management), Projective techniques, Psychiatry, Correlation techniques, Medical personnel

The study explored relationships between biographical information input and clinical evaluation output in an assessment program designed to select men for unusual and potentially hazardous assignments. Subjects were 14 experienced clinicians who served as examiners for the U. S. Antarctic research program and in this capacity evaluated Navy and civilian candidates for Antarctic scientific expeditions. Two professional groups, psychologists and psychiatrists, and two examining methods, Rorschach and interview, were compared with respect to relationships between biographical questionnaire data and clinical evaluation scores. Consistency among individual clinicians in their apparent utilization of 23 items of biographical information was revealed by the multiple regression technique. Rank or experience consistently contributed to prediction of the clinicians' evaluations, but variable weights were given to other attributes. (Author)

AD-632 206 Fld. 5/10
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y RESEARCH DEPT
RELATIONSHIP BETWEEN VERTICAL ORIENTATION IN THE ROD AND FRAME TEST AND IN A COMPENSATORY TRACKING TASK.
Research memo.,
by R. Benfari, and P. Vitale. 26 Mar 65, 8p.
Rept. no. RM-260J,

Unclassified report

Availability: Published in Perceptual and Motor Skills v20 p1073-80 1965. Copies to DDC users only.

Descriptors: (*Tracking, Performance (Human)), (*Proprioception, Performance tests), (*Aviation personnel, Performance tests), Naval personnel, Posture, Feedback, Visual perception, Pilots

Twelve selected naval aviators were given the Rod and Frame Test and were run through an experimental test involving a compensatory tracking task that had two conditions of proprioceptive feedback (kinetic and static). 5 Ss, classified as 'body oriented,' on the Rod and Frame Test, had a lower RMS roll score on the compensatory tracking than 5 Ss classified as 'frame oriented.' In addition to this finding, the Rod-and-Frame data of the aviator

sample were compared to Witkin's and Asch's data of 1948. A striking similarity on both constant and average error was observed between Witkin's and Asch's sample and the present group. Explanation for the differences in performance under the two conditions of the tracking task for the two categories of Ss was offered in terms of perceptual style. (Author)

AD-632 254 Fld. 5/10, 15/7, 5/11, 5/8, +
CFSTI Prices: HC $3.00 MF $0.75
ANALYTIC SERVICES INC FALLS CHURCH VA
PARAPHYSICAL VARIABLES IN WEAPON SYSTEM ANALYSIS,
by Irving J. Casey, and Wallace E. Larimore. Apr 66, 71p. Rept. no. AR-66-1,
Unclassified report

Descriptors: (*Warfare, *Psychology), Weapons, Anxiety, Bombing, Culture, Personality, Casualties, Enemy personnel, Social psychology, Fear, Wounds + injuries, Sociology, Military psychology

The effectiveness of a weapon system is dependent not only upon its physical characteristics but also upon the social characteristics of the enemy. The reaction of enemy combatants to attack is a function of personality, culture, and social organization. In order to obtain from a weapon system the results theoretically possible, these paraphysical variables must be considered. If the paraphysical effects of weapons are to be exploited, they must be expressed in a form which is usable in weapon system analysis. To accomplish this objective, it is proposed that the concept of modal personality be employed as a construct in the study of overt combat behavior to generate the basic data needed. (Author)

AD-632 358 Fld. 5/10, 5/9
CFSTI Prices: HC $2.60 MF $0.50
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
VALIDATION OF THE RECRUITER-SALESMAN SELECTION TEST,
by Iris H. Massey, and Cecil J. Mullins. Feb 66, 27p. Rept. no. PRL-TR-66-2,
Proj. AF-7719, Task 771906,
Unclassified report

Descriptors: (*Military personnel, Selection), (*Psychometrics, Military personnel), Mathematical prediction, Air force personnel, Students, Analysis

An eight-test experimental battery for selection of recruiter-salesmen was administered to 210 students taking the Recruiter Course at Lackland AFB. An interim operational battery (the Recruiter-Salesman Selection Test-63) was constructed, using the results of the preliminary testing of this small sample. Administration of the eight-test experimental battery was continued, however, until approximately 1000 recruiter -salesman course students had been tested. Background variables of age, education, marital status, number of dependents, length of military service, and AQE scores were combined with the test variables and analyzed to determine possibility of greater predictive power of other combinations of variables or of different weights for variables already included in the RSST-63. The predictor variables were correlated against school success and against a field rating criterion. Approximately half the group was used as a computing sample and the remainder as a cross-validation sample. Results indicated that the tests of the RSST-63, weighted as originally described, predict pass/fail in Recruiter School as well as it can be predicted (r = .21) by any combination of the variables used in the study. No combination of these variables predicts field ratings. It is doubtful that any predictor will be found to be valid against available field criteria. (Author)

AD-632 491 Fld. 5/10, 12/2
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV LOS ANGELES DEPT OF PSYCHOLOGY
THE EFFECTS OF MODES OF PRESENTATION AND LARGE REWARDS ON A PRISONERS' DILEMMA GAME.
Technical rept.,
by Philip S. Galio,Jr.. 15 Mar 66, 16p. Rept. no. TR-18,
Contract Nonr-233 (54), Proj. NR-171-350,
Unclassified report

See also AD-617 114.

Descriptors: (*Game theory, *Bargaining), Psychometrics, Prisoners, Decision making, Behavior

Eight male and eight female subjects played a matrix form of the Prisoners' Dilemma game; an additional eight male and eight female subjects played a non-matrix form of the game. Each subject played for both high monetary reward (maximum joint payoff of $1.00 per trial for 15 trials) and low monetary reward (maximum joint payoff of $.10 per trial for 15 trails). Half of the subjects played first for low reward and then for high. The order was reversed for the other half of the subjects. It was predicted that there would be greater cooperation when the subjects were given (1) large rewards as compared to small, and (2) non-matrix presentation as compared to matrix. The results failed to confirm these hypotheses. In addition, there were no sex differences in style of play nor were there significant interactions among the three variables. However, the overall level of cooperative play was considerably higher than is usually encountered in these games, averaging 55%, and the usual over trials decline in the percentage of cooperation was not observed. The results of the present study were compared with the results of more recent experiments which manipulated the same variables, and suggestions for future research were discussed. (Author)

AD-632 505 Fld. 5/10, 5/9
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
CULTURAL AND PSYCHOLOGICAL DIFFERENCES AMONG OCCUPATIONAL GROUPS,
by E. K. Eric Gunderson, and Jack L. Mahan. 10 Mar 66, 21p. Rept. no. 66-12,
NAVMED MF-022.01.03-9001
Unclassified report

Availability: Published in The Journal of Psychology v62 p287-304 1966. Copies to DDC users only.

Descriptors: (*Antarctic regions, Personnel), (*Personality, Psychometrics), (*Culture, Sociometrics), Selection, Job analysis, Adjustment (Psychology), Attitudes, Group dynamics

Cultural background and psychological differences were determined for nine occupational groups which are represented in the U. S. Antarctic Research Program. Cultural differences obtained could be largely subsumed under the concept of family socioeconomic status levels. Variability in personality measures tended to be consistent with those for cultural attributes. These occupational differences appear to have had a profound effect upon validities of biographical and personality data for performance prediction. Social and work roles at Antarctic small stations appeared generally consistent with the cultural and personality data. Heterogeneity in cultural backgrounds and personal values may affect the compatability and effectiveness of work groups in isolated settings. (Author)

AD-632 524 Fld. 5/10, 5/1, 12/2
CFSTI Prices: HC $2.00 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
DECISION-MAKING,
by Jacob Marschak. Dec 65, 41p. Rept. no. WMSI Working Paper-93,
Contract Nonr-233 (75), Proj. NR-047-041,
Unclassified report

Descriptors: (*Decision making, *Economics), Decision theory, Game theory, Probability

Descriptive decision theory is an extension of psychology or anthropology; prescriptive decision theory can be regarded as an extension of logic. Propositions of prescriptive theory can also be regarded as possible hypotheses of descriptive theory. Accordingly, an account of experiments that test such hypotheses is used to acquaint the reader with both the currently available empirical evidence and the main elements of current prescriptive literature. In addition, some alternative descriptive hypotheses are introduced, especially those of probabilistic nature; and the prescriptive materials are extended to include a brief discussion of sequential, informational, and exploratory strategies, and of the cost of decision. (Author)

AD-632 571 Fld. 5/10, 5/9, 6/19
CFSTI Prices: HC $2.00 MF $0.50
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
ADAPTATION TO EXTREME ENVIRONMENTS: THE ANTARCTIC VOLUNTEER.
Interim rept.,
by E. K. Eric Gunderson. Mar 66, 32p. Rept. no. 66-4,
NAVMED MR005.12-2004 ,NAVMED MF-022.01.03-9001
Unclassified report

Descriptors: (*Antarctic regions, Personnel), (*Adjustment (Psychology), Antarctic regions), Naval personnel, Civilian personnel, Environment, Adaptation (Physiology), Stress (Psychology), Stress (Physiology), Psychometrics

The report described the Antarctic Research Program, the Antarctic environment, characteristics of small stations, and the composition of wintering-over parties. Demographic and biographic characteristics of Antarctic volunteers, Navy and civilian, were analyzed, and preenlistment histories and military performance records of Navy Antarctic volunteers were compared with those of Navy men generally. The selection process was portrayed for Navy occupations represented at small stations, and ratios of applicants to assignments for three expeditions were presented. A detailed analysis was conducted of cultural and psychological differences among Antarctic occupational groups. The data were intended to present a rather complete picture of the Antarctic setting and the characteristics of Antarctic volunteers. (Author)

AD-632 583 Fld. 5/10, 6/16
HUMAN FACTORS RESEARCH INC SANTA BARBARA CALIF
SONAR DOPPLER DISCRIMINATION AND THE EFFECT OF A VISUAL ALERTNESS INDICATOR UPON DETECTION OF AUDITORY SONAR SIGNALS IN A SONAR WATCH.
Technical rept.,
by James O'Hanlon,Jr., Allyn Schmidt, and Chester H.Baker. Apr 66, 16p. Rept. no. TR-750-6,
Contract Nonr-4120 (00), Proj. NR-196-035,
Unclassified report

Availability: Published in Human Factors p129-39 Apr 65. Copies to DDC users only.

Descriptors: (*Pitch discrimination, *Sonar signals), (*Auditory acuity, Sonar signals), (*Sonar personnel, Auditory perception), (*Tolerances (Physiology), Sound), Vision, Doppler systems, Stress (Physiology), Psychophysiology, Training, Detection

Research reported nearly 20 years ago concluded that the ability to make auditory pitch discriminations is impaired in some Ss by prolonged listening

to sonar returns. As a special type of pitch discrimination, discrimination of doppler, is of importance in classifying sonar signals, an experiment was performed to determine whether or not listening to sonar returns for 90 minutes impairs the ability to discriminate doppler. No impairment was found. A second aim of this experiment was to evaluate the effectiveness of an alertness indicator when listening for sonar signals. With the indicator 16 per cent more signals were detected than without it. (Author)

AD-632 629 Fld. 5/10, 6/16
CAMBRIDGE UNIV (ENGLAND) PSYCHOLOGICAL LAB
EFFECTS OF FRONTAL CORTEX LESIONS ON OBJECT DISCRIMINATION LEARNING BY MONKEYS,
by John Oxbury, and Lawrence Weiskrantz.
1966, 4p. Contract AF 61 (052)-185,AF-AFOSR-62-20
Unclassified report

Availability: Published in Nature v195 n4838 p310-11 Jul 21 1962. Copies to DDC users only.

Descriptors: (*Learning, Psychophysiology), (*Visual perception, Monkeys), Retraining, Performance tests, Brain, Training, Great Britain

AD-632 630 Fld. 5/10, 6/16
CAMBRIDGE UNIV (ENGLAND) PSYCHOLOGICAL LAB
EFFECTS OF STIMULATION ON FRONTAL CORTEX AND HIPPOCAMPUS ON BEHAVIOUR IN THE MONKEY,
by L. Weiskrantz, Lj. Mikhailovic, and C. G. Gross. 1962, 21p. Contract AF 61 (052)-185,
Unclassified report

Availability: Published in Brain, v85 pt3 p487-504 1962. Copies to DDC users only.

Descriptors: (*Brain, Stimulation), (*Auditory perception, Monkeys), (*Visual perception, Monkeys), Behavior, Psychophysiology, Performance tests, Great Britain, Cerebral cortex, Learning

The effects of stimulation of various regions at intensities below the threshold for overt motor responses, was studied on a variety of behavioural tasks, with the following results: (1) A reversible deficit in delayed alternation was obtained by bilateral stimulation in the region of sulcus principalis. During stimulation performance approached chance levels. (2) Unilateral stimulation in the region of sulcus principalis produced a significant and reversible deficit in delayed alternation, although the decrement was not as great as that produced by bilateral stimulation. (3) No such deficit was obtained from stimulation of regions near sulcus arcuatus. (4) No effect of frontal stimulation on auditory discrimination performance could be found. (5) Hippocampal stimulation had a slight effect on both delayed alternation and auditory discrimination. (6) Unilateral or bilateral stimulation near sulcus principalis produced a decrement in the speed with which object discrimination tasks were solved. No such decrement was obtained for the more difficult two-dimensional pattern discrimination problems. (Author)

AD-632 631 Fld. 5/10, 6/16
CAMBRIDGE UNIV (ENGLAND) PSYCHOLOGICAL LAB
EVIDENCE FOR DISSOCIATION OF IMPAIRMENT ON AUDITORY DISCRIMINATION AND DELAYED RESPONSE FOLLOWING LATERAL FRONTAL LESIONS IN MONKEYS,
by Charles G. Gross, and Lawrence Weiskrantz.
23 Jan 62, 24p. Contract AF 61 (052)-185,
Unclassified report

Availability: Published in Experimental Neurology v5 n6 p453-76 June 1962. Copies to DDC users only.

Descriptors: (*Auditory acuity, Psychophysiology), (*Learning, Monkeys), Reaction (Psychology), Behavior, Emotions, Brain, Cerebral cortex, Retention, Great Britain

Impairments on both delayed-response and auditory -discrimination tasks have been reported to follow lateral frontal cortical lesions in monkeys. The present study is primarily concerned with the relationship of these two deficits. Three monkeys received ablations of sulcus principalis; three received ablations of lateral frontal cortex excluding sulcus principalis. Acquisition and retention of auditory-discrimination, delayed-response, and visual-discrimination tasks by the two groups were compared. Sulcus principalis lesions produced greater impairment on the delayed-response tasks. The lesions sparing sulcus principalis produced greater impirment on the auditory-discrimination tasks. The performance of the groups did not differ on the visual-discrimination tasks. These results suggest that the delayed-response deficit and the deficit in auditory discrimination that follow large frontal lesions may be dissociated by smaller frontal lesions. The results confirm that the focus for impairment on tests of the delayed-response type is in the region of sulcus principalis. The experimental data do not indicate the focus (if any) for the auditory-discrimination deficit, nor do they permit the definition of the nature of this deficit including its modality specificity. (Author)

AD-632 632 Fld. 5/10, 6/16
CAMBRIDGE UNIV (ENGLAND) PSYCHOLOGICAL LAB
ROLE OF EXPERIENCE IN MISREACHING PRODUCED BY VISUAL CORTEX LESIONS,
by A. Cowey, and L. Weiskrantz. 1966, 2p. Contract AF 61 (052)-185,
Unclassified report

Availability: Published in Nature v192 n4809 p1319 Dec 30 1961. Copies to DDC users only.

Descriptors: (*Motor reactions, Vision), (*Visual perception, Motor reactions), Monkeys, Pathology, Adaptation (Physiology), Great Britain

AD-631 887 **See Fld. 6/16**

AD-631 888 **See Fld. 6/16**

AD-631 889 **See Fld. 6/16**

AD-631 890 **See Fld. 6/16**

AD-631 891 **See Fld. 6/16**

AD-631 893 **See Fld. 6/16**

AD-631 899 **See Fld. 6/16**

AD-631 916 **See Fld. 6/16**

AD-631 917 **See Fld. 6/16**

AD-631 981 **See Fld. 6/16**

AD-631 986 **See Fld. 5/9**

AD-632 045 **See Fld. 6/3**

AD-632 046 **See Fld. 6/3**

AD-632 047 **See Fld. 6/3**

AD-632 048 **See Fld. 6/3**

AD-632 090 **See Fld. 6/3**

AD-632 182 **See Fld. 5/9**

AD-632 289 **See Fld. 6/16**

AD-632 389 **See Fld. 6/5**

AD-632 601 **See Fld. 6/19**

5/11. SOCIOLOGY

AD-632 235 Fld. 5/11, 5/4, 5/3, 15/4
AMERICAN UNIV WASHINGTON D C FOREIGN AREA STUDIES DIV
U. S. ARMY AREA HANDBOOK FOR SYRIA.
Jul 65, 390p.
DA PAM-550-47
Unclassified report

Availability: Superintendent of Documents, GPO, Washington, D. C. 20402, HC $1.25, as D-101.22:550-47.

Descriptors: (*Syria, Handbooks), (*Social sciences, Syria), Sociology, Economics, Language, Agriculture, Political science, Culture, Education, Religion, Industries, Budgets, National defense, Foreign policy, Armed forces (Foreign)

The emphasis is on objective description of contemporary national societies, focusing on basic social, economic and political institutions. Treatment is intended to be comprehensive rather than exhaustive. The studies are introductory, and it is expected that the reader will have recourse to many other sources for more detailed information in areas of special interest. Extensive bibliographies are included for this purpose.

AD-631 980 **See Fld. 5/9**

AD-632 254 **See Fld. 5/10**

AD-632 476 **See Fld. 5/6**

Field 6-BIOLOGICAL AND MEDICAL SCIENCES

6/1. BIOCHEMISTRY

AD-631 904 Fld. 6/1, 20/2, 8/7
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
CRYSTALLOGRAPHIC STUDIES OF CALCIUM AND STRONTIUM HYDROXYAPATITES,
by Curt Lagergren, and Diego Carlstrom. 16 Jan 57, 6p. Rept. no. TN-1,
Contract AF 61 (514)-861,
Unclassified report

Availability: Published in Acta Chemica Scandinavica v11 n3 p545-50 1957. Copies to DDC users only.

Descriptors: (*Bone, *Minerals), (*Calcium compounds, Phosphates), (*Strontium compounds, Phosphates), Crystallography, X-ray diffraction analysis, Hydroxides, Crystal lattices, Chemical bonds, Sweden

From X-ray crystallographic investigations on apatites in the system Ca10 (PO4)6 (OH)2--Sr10 (PO4)6 (OH)2 it was found that no solid solutions could be formed in the region Ca3Sr7 (PO4)6 (OH)2 to Ca7Sr3 (PO4)6 (OH)2. The mixed apatite Ca5Sr5 (PO4) (OH)2, however, was shown to have a very well ordered lattice. In the light of these experimental findings, it is concluded that strontium ions in the inorganic crystalline phase of bone are probably bound rather firmly to the surface of the extremely small apatite crystallites. (Author)

AD-631 995 Fld. 6/1, 7/3
CFSTI Prices: HC $3.00 MF $0.50
NORTHEASTERN UNIV BOSTON MASS
STUDIES ON FOAM FRACTIONATION AND APPLICATION TO LIPOID MATERIALS.
Final rept., 1 Jul 64-30 Sep 65 (technical),
by Barry L. Karger. Apr 66, 56p. Contract DA-19-129-AMC-302 (N), Proj. DA-1K0-12501-A034,

USA-NLABS FD-43 ,USA-NLABS FD-66-25
Unclassified report

Descriptors: (*Foams, *Distillation), (*Phospholipids, Distillation), Lipids, Solvent extraction, Dyes, Recovery, Separation, Salts, Fatty acids

A simplified apparatus has been developed for the recovery and concentration of ionic species by foam fractionation. The process involves total reflux by thermal breakage of foam at the top of the column. Mechanical breakage can also be used when heat sensitive materials are used. The system has been applied to several dyes initially and then to the successful recovery of phospholipids and trace concentrations of salts of fatty acids. Solvent sublation has also been investigated as a selective separation technique. Exploratory studies indicate that the extraction process is kinetically controlled and that time might therefore be an effective separation parameter. (Author)

AD-632 019 Fld. 6/1, 6/3, 6/15
OXFORD UNIV (ENGLAND) DEPT OF PHARMACOLOGY
SPERMINE OXIDASE AND BENZYLAMINE OXIDASE. DISTRIBUTION, DEVELOPMENT AND SUBSTRATE SPECIFICITY.
Revised ed.,
by H. Blaschko, and Rosemary Bonney. 15 Jan 62, 12p. Contract AF 61 (052)-235, AFOSR 3615
Unclassified report

Revision of manuscript submitted 29 Nov 61.

Availability: Published in Proceedings of the Royal Society, B, v156 p268-79 1962. Copies to DDC users only.

Descriptors: (*Oxidoreductases, Mammals), Blood plasma, Distribution, Goats, Swine, Equines, Primates, Great Britain

A survey has been made of the distribution of the two types of amine oxidase that occur in mammalian blood plasma. Spermine oxidase has been found in all ruminants (Ruminantia and Tylopoda) examined, and also in the hippopotamus and two members of the order Hyracoidea. Benzylamine oxidase has a much wider distribution; it occurs not only in Ungulates and Carnivores, but has also been found in some Primates. Benzylamine oxidase was not found in the blood plasma of newborn piglets; in newborn foals the enzymic activity was low. Spermine oxidase activity, absent or very low in the newborn kid, developed at similar rates in kids kept with the mother, bedded on straw, and in those removed from the mother and bedded on wood shavings. The plasma amine oxidases differ from the intracellular amine oxidase in that they are unable to oxidize N-methylated secondary amines. (Author)

AD-632 020 Fld. 6/1
SUDDEUTSCHE VERSUCHTS- UND FORSCHUNGSANSTALT FUR MILCHWIRTSCHAFT WEIHENSTEPHAN (WEST GERMANY)
DIFFERENCES IN THE PH OPTIMUM OF THE PHOTOSYNTHETIC FIXATION OF CARBON DIOXIDE IN ISOLATED WHOLE AND BROKEN CHLOROPLASTS,
by Helmut Elbertzhagen, and Otto Kandler. 1962, 3p. Contract AF 61 (052)-244, AFOSR 4339
Unclassified report

Availability: Published in Nature v194 n4825 p312-3 Apr 21 1962. Copies to DDC users only.

Descriptors: (*Chloroplasts, Photosynthesis), (*Photosynthesis, pH), Carbon dioxide, West Germany

AD-632 023 Fld. 6/1, 6/13
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
CARBON ASSIMILATION BY PSEUDOMONAS OXALATICUS (OX1). 6. REACTIONS OF OXALYL -COENZYME A.
by J. R. Quayle. 16 Nov 62, 6p. Contract AF 61 (052)-180,
Unclassified report

Availability: Published in Biochem. J., v87 p368-373 1963. Copies to DDC users only.

Descriptors: (*Pseudomonas, Metabolism), (*Coenzymes, Chemical reactions), Oxalic acids, Esters, Glyoxylic acid, Oxidation, Reduction (Chemistry), Chemical equilibrium, Oxidoreductases, Thiols, Spectroscopy, Great Britain

Oxalyl-CoA was prepared by ester interchange between thiocresyl hydrogen oxalate and CoA. Oxalyl-CoA was shown to be the product of the CoA- and NADP-linked oxidation of glyoxylate in the presence of oxalyl-coenzyme A reductase. The enzymic reduction of oxalyl-CoA to glyoxylate has a pH optimum at 6.75. The enzyme is inhibited in the presence of tris buffer. The equilibrium constant for the reduction of oxalyl-CoA to glyoxylate by oxalyl-coenzyme A reductase is 138,000 at 25C. From this value, delta G' at pH 7.0 for the reaction is calculated to be +2.54 kcal. A non-enzymic ester interchange between oxalyl-CoA and thiol compounds such as cysteine and glutathione was found. This accounts for the previous inability to isolate oxalyl-CoA as the reaction product from glyoxylate oxidation. The use of oxalyl-coenzyme A reductase for the direct spectrophotometric determination of glyoxylate, oxalyl-CoA and CoA is discussed. (Author)

AD-632 030 Fld. 6/1
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
CHEMICAL SYNTHESIS OF OXALYL-COENZYME A AND ITS ENZYMIC REDUCTION TO GLYOXYLATE,
by J. R. Quayle. 18 Dec 61, 3p. Contract AF 61 (052)-180,
Unclassified report

Availability: Published in Biochim. Biophys. Acta. v57 p398-400 1962. Copies to DDC users only.

Descriptors: (*Coenzymes, Chemical reactions), Synthesis (Chemistry), Reduction (Chemistry), Glyoxylic acid, Oxidoreductases, Oxalic acid, Esters, Thiols, Great Britain

Oxalyl-coenzyme A was prepared in yields of 90-100% by ester interchange between thiocresyl-oxalic acid and coenzyme A at pH 7.2. Incubation of oxalyl-coenzyme A with TPNH at pH 6.5 in the presence of glyoxylate dehydrogenase resulted in the disappearance of 1 mole each of coenzyme A and TPNY, and the formation of 1 mole of glyoxylate. The results establish the following reaction and its reversibility: HO2C-CHO + CoA-SH + TPN (+) = HO2C-CO-S-CoA + TPNH + H (+).

AD-632 031 Fld. 6/1, 6/13
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
CRYSTALLINE TARTRONIC SEMIALDEHYDE REDUCTASE FROM PSEUDOMONAS OVALIS CHESTER,
by A. M. Gotto, and H. L. Kornberg. 27 Feb 61, 2p. Contract AF 61 (052)-180, AFOSR 1722
Unclassified report

Availability: Published in Biochem. Biophys. Acta. v48 p604-5 1961. Copies to DDC users only.

Descriptors: (*Bacterial extracts, Oxidoreductases), (*Pseudomonas, *Oxidoreductases), Crystals, Purification, Aldehydes, Reduction (Chemistry), Great Britain

A method is given for the preparation of crystalline tartronic semialdehyde reductase from Pseudomonas ovalis grown on glycollate as the sole carbon source. The resultant extract is capable of catalyzing the reduction of tartronic semialoehyde (Km = 0.0002M) to glycerate with concomitant oxidation of DPNH (Km = 0.00002M) or TPNH (Km = 0.00006M).

AD-632 032 Fld. 6/1, 6/13
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
MICROBIAL GROWTH ON C1 COMPOUNDS. DISTRIBUTION OF RADIOACTIVITY IN METABOLITES OF METHANOL-GROWN PSEUDOMONAS AM1 AFTER INCUBATION WITH (14C) METHANOL AND (14C) BICARBONATE,
by P. J. Large, D. Peel, and J. R. Quayle. 14 Sep 61, 6p. Contract AF 61 (052)-180, AFOSR 3454
Unclassified report

See also AD-612 241.

Availability: Published in Biochemistry Journal v82 p483-8 1962.

Descriptors: (*Bacteria, Metabolism), (*Pseudomonas, Metabolism), (*Culture medium, Carbon compounds), (*Metabolism:, Tracer studies), Methanol, Carbonates, Labeled substances, Glycines, Amino acids, Organic phosphorus compounds, Malic acid, carbon dioxide, Biosynthesis, Great Britain

The distribution of radioactivity in glycine, serine, phosphoglyceric acid and malic acid isolated from methanol-grown Pseudomonas AM1 after incubation with methanol-C14 or bicarbonate-C14 was investigated. The data indicate that the carboxyl group of glycine is mainly derived from carbon dioxide and the methylene carbon from methanol. The hydroxymethyl group of serine is derived mainly from methanol, whereas the distribution of radioactivity between C-1 and C-2 of serine is the same under all conditions as that between C-1 and C-2 of glycine. The labelling patterns of serine and malate are consistent with the formation of malate by carboxylation of a C3 fragment derived from serine, rather than with the reverse reaction. Two possible schemes for synthesis of cell constituents from methanol are outlined. Both schemes implicate hydroxymethylation of glycine to give serine as the major step in the synthesis of C3 compounds. Alternative means whereby the glycine necessary for such a reaction might be made from methanol are discussed. (Author)

AD-632 033 Fld. 6/1, 6/13
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
MICROBIAL GROWTH ON C1 COMPOUNDS. CARBOXYLATION OF PHOSPHOENOLPYRUVATE IN METHANOL-GROWN PSEUDOMONAS AM1,
by P. J. Large, D. Peel, and J. R. Quayle. 7 May 62, 8p. Contract AF 61 (052)-180, AFOSR 4292
Unclassified report

See also AD-632 032.

Availability: Published in Biochemistry Journal v85 p243-50 1962. Copies to DDC users only.

Descriptors: (*Bacteria, Metabolism), (*Pseudomonas, Metabolism), (*Culture medium, Carbon compounds), (*Carboxy-lyases, Pseudomonas), Organic phosphorus compounds, Pyruvates, Carboxylic acids, Biosynthesis, Enzymes, Purification, Electrolytes (Physiology), pH, Great Britain

Cell-free extracts of methanol-grown Pseudomonas AM 1 have been examined for the presence of enzymes catalysing the carboxylation of pyruvate or phosphoenolpyruvate to C4 dicarboxylic acids. The only enzyme system found in appreciable activity was a phosphoenolpyruvate carboxylase, simila to that found in plant tissues. The enzyme was purified 28-fold by protamine sulphate treatment, ammonium sulphate precipitation and diethylaminoethylcellulose column chromatography. The purified phosphoenolpyruvate carboxylase catalyses the formation of oxaloacetate and inorganic phosphate from phosphoenolpyruvate and bicarbionate. The reaction is Mg2 + iondependent, with a pH optimum of 8.5. It is competitively inhibited by phosphate and non-competitively inhibited by ammonium ions. Km values of 0.33 mM and 0.196 mM respectively have been found for phosphoenolpyruvate and magnesium chloride at pH 8.5 and 22C. The properties of the enzyme are compared with those of similar enzymes obtained from other sources. (Author)

AD-632 034 Fld. 6/1, 6/13
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
PURIFICATION AND PROPERTIES OF MALATE SYNTHETASE,
by G. H. Dixon, H. L. Kornberg, and Patricia Lund. 9 Oct 59, 17p. Contract AF 61 (052)-180, AFOSR 323

Unclassified report

Availability: Published in Biochimica et Biophysica Acta v41 p217-33 1960. Copies to DDC users only.

Descriptors: (*Bacterial extracts, Enzymes), (*Pseudomonas, Enzymes), (*Enzymes, Purification), (*Yeasts, Enzymes), Coenzymes, Reduction (Chemistry), Malic acid, Biosynthesis, Chemical properties, Reaction kinetics, pH, Electrolytes (Physiology), Catalysis, Glyoxylic acid, Labeled substances, Great Britain

Procedures are described for the purification of malate synthetase from baker's yeast and from glycollate-grown Pseudomonas ovalis Chester. The properties of the enzymes are closely similar: both are optimally active at pH 8.5, but that from yeast shows greater activity below this pH than that from Ps. ovalis. The enzymes require Mg (++) for activity and are competitively inhibited by the C2-acids oxalate fluoroacetate and glycollate. The purified enzymes are specific for glyoxylate. In the presence of glyoxylate, there was no reaction with S,N-diacetyl Beta-mercaptoethylamine, S-acetyl pantetheine, propionyl coenzyme A or butyryl coenzyme A, but fluoroacetyl coenzyme A was split at approximately one quarter of the rate observed with similar concentrations of acetyl-S-CoA. Malyl-S-CoA was not split by the enzymes, either alone or in the presence of glyoxylate. The equilibrium of the reaction strongly favours malate formation: no reversal of the reaction was detected. Procedures are described for the preparation of coenzyme A-S35 which was used to test for the possible formation of an acyl enzyme as an intermediate in the malate synthetase reaction. The properties of malate synthetase are compared with those of the citrate-forming condensing enzyme. (Author)

AD-632 127 Fld. 6/1, 6/3
CFSTI Prices: HC $3.60 MF $0.50
LUND UNIV (SWEDEN)
LOCALIZATION OF MONOAMINERGIC MECHANISMS.
Final rept.,
by Erik Dahl, and Bengt Falck. 26 Jan 66, 33p. Contract AF-EOAR-64-5, Proj. AF-9777, Task 977701,
AFOSR 66-0711

Unclassified report

Descriptors: (*Amines, Biochemistry), (*Nervous system, Amines), Chemoreceptors, Histological techniques, Fluorescence, Electron microscopy, Mollusca, Annelida, Crustacea, Pigeons, Eye, Endocrine glands, Fishes, Cells (Biology), Sweden

Using the sensitive and specific fluorescence method of FALCK and HILLARP in combination with electron microscopy and biochemical methods for the localization and estimation of the monoamines, their immediate precursors, and the pertinent enzymes, monoaminergic nervous mechanisms are studied in a bread comparative material. The fluorescence method has been thoroughly studied both from the chemical and histochemical point of view and is now well standardized. Monoaminergic mechanisms constitute a considerable part of the mollusc nervous system. These mechanisms were studied in both gastopod and bivalve species. Studies of similar type were carried out on annelids and crustaceans and these have disclosed further monoaminergic mechanisms. Some of the monoaminergic system in the upper brain stem in the pigeon have been mapped out. A comprehensive study is performed on the sympathetic innervation of the eye and its adnexa. The dilator muscle of the rat iris was found to contain a hitherto unknown cholinergic ground-lexus. Although the cholinergic receptor is not identified there are reasons for believing that an interaction exists between these two terminal plexus. The monoaminergic mechanisms in the pineal gland are studied in several mammalian species. Monoaminergic mechanisms in the hypothalamo -hypophysical complex are under investigation. In the cod, the existence of short noradrenergic neurons having their cell bodies located peripherally near the effector cells was demonstrated. (Author)

AD-632 179 Fld. 6/1, 7/4
STANFORD UNIV CALIF DEPT OF CHEMISTRY
DIMENSION OF POLYPEPTIDE CHAINS IN HELICOGENIC SOLVENTS,
by Wilmer G. Miller, and Paul J. Flory. 18 Aug 65, 19p. Contract AF 49 (638)-1341, Proj. AF-9760, Task 976003,
AFOSR 66-0685

Unclassified report

Availability: Published in J. Mol. Biol. v15 p298-314 1965. Copies to DDC users only.

Descriptors: (*Peptides, Molecular properties), (*Helixes, Peptides), Glutamic acids, Amino acids, Ethers, Solvents, Formamides, Molecular structure, Chemical bonds, Polymers, Matrix algebra

Observed departures of the mean square end-to-end distance < r sq.> and radius of gyration <S sq.> of polypeptides (poly-gamma-benzyl-L-glutamate and polycarbobenzoxy-L-lysine) of high molecular weight in helicogenic solvents such as dimethylformamide from the values of these quantities expected for rigid rods may be attributed either to (i) random deviations of bond rotation angles from their preferred (alpha -helical) values, or to (ii) occasional interruptions of the helix by sequences of random-coil units. Methods are presented for exact calculation of < r sq.> and xxx< S sq.> for chains of any average degree of helicity, and it is shown that agreement with experiment on the basis of the second explanation can be achieved by suitable choice of parameters. For a given value of the free energy of helix initiation, however, the random coil = helix equilibrium constant must fall within narrow limits. As a consequence of end effects and of the tendency of the random coil towards extended conformations, the average dimension of a low molecular weight polypeptide exceeds that for the intact alpha -helix. This deduction provides an explanation for the experimental finding that the apparent axial translation per residue for low molecular weight polypeptides is greater than 1.5A. Published experimental results are critically examined and compared. (Author)

AD-632 180 Fld. 6/1, 7/4
STANFORD UNIV CALIF DEPT OF CHEMISTRY
A GENERAL TREATMENT OF HELIX-COIL EQUILIBRIA IN MACROMOLECULAR SYSTEM,
by Paul J. Flory, and Wilmer G. Miller. 18 Aug 65, 16p. Contract AF 49 (638)-1341, Proj. AF-9760, Task 976003,
AFOSR 66-0677

Unclassified report

Availability: Published in J. Mol. Biol. v15 p284-97 (1966). Copies to DDC users only.

Descriptors: (*Peptides, Molecular properties), (*Nucleotides, Molecular properties), (*Helixes, Polymers), Chemical equilibrium, Statistical mechanics, Molecular structure, Desoxyribonucleic acids, Polymers, Matrix algebra

Statistical mechanical methods recently developed for treating the properties of linear chains are here applied to helix-coil equilibria in systems of single-strand (polypeptide) and double-strand (polynucleotide) helices. Chains of any finite length and copolymeric chains comprising units having different helix-forming tendencies can be treated rigorously by these methods. The partition function, the average degree of helicity and related quantities are formulated in terms of products of factors (matrices), one for each kind of unit. Execution of numerical calculations requires specification of the sequential order of the various units in the macromolecular chain. In the case of random copolymers, representative sequences may be generated as random numbers, the computations being carried out as prescribed by them. These methods are readily applicable to DNA helices, with account being taken not only of the different pairing energies for AT and GC but also for the ten possible distinct stacking energies for neighbor pairs formed from AT, TA, GC and CG. (Author)

AD-632 195 Fld. 6/1, 7/5, 6/16
CFSTI Prices: HC $4.00 MF $1.00
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
ENERGY TRANSFER IN PHOTOBIOLOGY AND PHOTOCHEMISTRY: ANNOTATED BIBLIOGRAPHY, PARTS I AND II.
ATD work assignment no. 79, task 30,
by Boris Nartsissov. 31 Dec 65, 135p. Rept. no. ATD-65-102,
TT 66-61191

Unclassified report

Annotated bibliography compiled from Soviet open sources pub. 1958-1963. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Photosynthesis, Bibliographies), (*Vision, Bibliographies), (*Photochemistry, Bibliographies), Abstracts, Energy, Photosensitivity (Biological), Chlorophyll, Biosynthesis, Luminescence, Organic pigments, USSR

The material is divided into two sections: (1) energy transfer in photosynthesis, and (2) energy transfer in vision processes. The entries are arranged alphabetically and are numbered. For the convenience of the user, the two main subjects are broken down into topic tags covering both general and specific concepts. In addition, the entries are provided with descriptors, or expanded topic tags which include a few more concepts. Three indices are included: (1) Classification of entries by topic tags, (2) authors, and (3) associations. All items in the indices are cross-referenced to the entry numbers. Topic tags are given in the entries by numbers and letters keyed to the Topic Tag Index. The bibliography contains approximately 250 entries.

AD-632 261 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ANTICHOLINESTERASE PROPERTIES OF SOME O-ETHYL S-ALKYL METHYLTHIOPHOSPHONATES. 2. KINETICS OF INHIBITION OF CHOLINESTERASE AND ACETYLCHOLINESTERASE BY O-ETHYL S-N -ALKYL METHYLTHIOPHOSPHONATES,
by E. V. Rozengart, E. I. Godyna, and N. N. Godovikov. 29 Apr 66, 14p. Rept. no. FTD-HT-66-194,
TT 66-61198

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Khimicheskaya, n8 p1370-5 1965.

Descriptors: (*Cholinesterase inhibitors, *Organic phosphorus compounds), Organic sulfur compounds, Cholinesterase, Acetylcholinesterase, Inhibition, Reaction kinetics, Hydrolysis, Molecular properties, USSR

The kinetics of the interaction of O-ethyl S-n-alkyl methylthiophosphonates with horse serum cholinesterase and bovine erythrocyte acetylcholinesterase was investigated. The water-alkyl hydrolysis constants of the studied compounds were determined. The anticholinesterase activity of the O-ethyl S-n-alkyl methylthiophosphonates strongly depends upon the length of the alkyl radical. (Author)

AD-632 267 Fld. 6/1, 6/3
CFSTI Prices: HC $1.00 MF $0.50
CHILE UNIV SANTIAGO LABORATORIO DE BIOFISICA
BIOCHEMICAL PROPERTIES OF SQUID AXON MEMBRANES.
Annual rept. no. 1,
by Mitzy Canessa, Fernando Vargas, Cecilia Hidalgo, Valentina Riveros, and Italo Zamudio.
Feb 66, 18p. Contract AF-AFOSR-788-65,
AFOSR 66-0716

Unclassified report

Descriptors: (*Nerve cells, Cephalopoda), (*Adenosine phosphates, Nerve cells), (*Electrolytes (Physiology), Nerve cells), (*Erythrocytes, Biochemistry), Membranes (Biology), Semipermeability, Transport properties, Sodium, Enzymes, Metabolism, Cardiac glycosides, Oxidoreductases, pH, Inhibition

Biochemical and physiological studies in the giant axons of the Chilean squid Dosidicus Gigas were carried out in order to correlate metabolic dependent sodium transport and the enzymic profile of nerve membranes. Membrane fractions were isolated from the sheath of giant fibers by means of differential centrifugations and its ATP splitting system was studied as a function of pH, cations, anions composition of the media, as well as the effect of ouabain, and the excess of substrate. Evidence accumulated by these studies indicate that the velocity of the enzyme reaction is dependent on the hydration of the cation, the hydration of the anion and is dependent on the charge of the enzyme particle at different pH values. Na-22 efflux from intact axons was almost completely inhibited by 0.00001 M ouabain. Intraplasmic microinjection of ATP did not recovered sodium transport of ouabain-inhibited nerves, as cyanide-treated one occurred. Microinjection of ATP to normal axons inhibited sodium transport, probably because the excess of substrate inhibited the ATP splitting system of the isolated membrane fractions. (Author)

AD-632 272 Fld. 6/1, 6/3
SUDDEUTSCHE VERSUCHTS- UND FORSCHUNGSANSTALT FUR MILCHWIRTSCHAFT WEIHENSTEPHAN (WEST GERMANY)
VERANDERUNGEN VON ZWISCHENSTOFFKONZENTRATIONEN BEI DER GRUNALGE CHLORELLA IN ABHANGIGKEIT VON DER PHOTOSYNTHESE (CHANGES IN THE POOL SIZES OF VARIOUS INTERMEDIATES DURING PHOTOSYNTHESIS IN CHLORELLA),
by Inge Liesenkotter. Nov 61, 111p. Contract AF 61 (052)-244,
AFOSR 4350

Unclassified report

Doctoral dissertation presented at Munich Univ. (West Germany).

Descriptors: (*Chlorella, Photosynthesis), Glucose, Phosphates, Pyruvates, Organic phosphorus compounds, Adenosine phosphates, Saccharide phosphates, Glycolysis, Oxygen, Carbon dioxide, Inhibition, Phosphorylation, Oxidoreductases, Acetic acids, Labeled substances, Chloroplasts, West Germany

AD-632 273 Fld. 6/1, 6/3
CFSTI Prices: HC $3.60 MF $0.50
SUDDEUTSCHE VERSUCHTS- UND FORSCHUNGSANSTALT FUR MILCHWIRTSCHAFT WEIHENSTEPHAN (WEST GERMANY)
STUDIES ON THE CHANGES IN POOL SIZES OF VARIOUS INTERMEDIATES DURING PHOTOSYNTHESIS UNDER THE INFLUENCE OF DIFFERENT EXTERNAL FACTORS AND INHIBITORS.
Annual summary rept.,
by O. Kandler. 1 May 61, 31p. Contract AF 61 (052)-244,

Unclassified report

Descriptors: (*Chlorella, Photosynthesis), Phosphates, Glycolysis, Carbon dioxide, Acetic acids, Saccharide phosphates, Oxidoreductases, Organic phosphorus compounds, Pyruvates, Enzymes, Metabolism, Adenosine phosphates, Arsenic compounds, Phosphorylation, Radioactivity, Biosynthesis, Chloroplasts, Light, Labeled substances, Inhibition

The change of the concentration of PGA, FDP, DAP, GAP, PEP, Pyuvate, ADP and ATP in Chlorella during the transition from light to dark, air (or N2) + CO2 to air (or N2) - CO2 and vice versa as well as the effect of monoiodo acetic acid, arsenate and DNP were determined. The possibility of a PGA by-pass for the path of carbon in occur via a PGA by-pass. Photosynthesis is discussed. (Author)

AD-632 305 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
UNIVERSITY COLL DUBLIN (IRELAND) UNIT OF CELL METABOLISM
ACTIVE TRANSPORT OF IONS.
Final scientific rept.,
by Edward J. Conway. 27 Feb 66, 4p. Contract AF 61 (052)-852,
AFOSR 66-0717

Unclassified report

Descriptors: (*Electrolytes (Physiology), Semipermeability), Sodium, Potassium, Amphibians, Muscles, Adrenal cortex, Rats, Membranes (Biology), Ions, Transport properties, Blood plasma, Adenosine phosphates, Inhibition, pH, Electron microscopy, Yeasts, Anoxia, Cyanides, Great Britain

AD-632 508 Fld. 6/1, 6/16
CFSTI Prices: HC $7.60 MF $0.75
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
RESEARCH IN BONE AND TOOTH STRUCTURE.
Final technical rept.,
by M. J. Dallemagne. 31 May 61, 73p. Contract AF 61 (052)-268,

Unclassified report

Descriptors: (*Teeth, Chemical analysis), (*Bone, Chemical analysis), Calcium compounds, Phosphates, Organic compounds, Inorganic compounds, Radioactive isotopes, Infrared spectroscopy, Molecular structure, Chemical reactions, In vivo analysis, Belgium

Contents: The molecular structure of synthetic calcium phosphates and of bone and tooth minerals. The molecular structure of synthetic calcium phosphates. The pyrophosphate contents of heated bone and teeth mineral. The influence of hydrochloric washings on the pyrophosphate contents of heated bone and tooth minerals. In vivo experiments related to the presence of pyrophosphate in heated bone. Chemical relations between the organic and the inorganic fractions of bone. Calcium isotope studies on bone and tooth minerals.

AD-632 628 Fld. 6/1, 6/13
MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT
THE METABOLISM OF C2-COMPOUNDS IN MICRO -ORGANISMS. 8. A DICARBOXYLIC ACID CYCLE AS A ROUTE FOR THE OXIDATION OF GLYCOLLATE BY ESCHERICHIA COLI,
by H. L. Kornberg, and J. R. Sadler. 25 May 61, 11p. Contract AF 61 (052)-180,

Unclassified report

See also AD-632 031.

Availability: Published in Biochem. J. v81 p503-13 1961. Copies to DDC users only.

Descriptors: (*Carbon compounds, Metabolism), (*Escherichia coli, *Metabolism), (*Carboxylic acids, Metabolism), Alcohols, Oxidation, Culture medium, Tracer studies, Acetates, Malic acid, Pyruvates, Coenzymes, Enzymes, Growth, Great Britain

It is shown that, whereas the tricarboxylic acid cycle plays an essential role in the growth of Escherichia coli on glycollate as sole carbon source, this cycle is not necessary for glycollate oxidation. The results obtained with the mutant M22-64 of E. coli, strain w, which is devoid of the citrate-forming condensing enzyme, and with its parent wild type, support the view that glyoxylate, derived from the oxidation of glycollate, can be oxidized completely via a dicarboxylic acid cycle in which glyoxylate condenses with acetylcoenzyme A to form malate, which is oxidized via oxaloacetate and pyruvate to regenerate the acetyl -coenzyme A required for the initial condensation. (Author)

AD-632 634 Fld. 6/1
MAX-PLANCK-INSTITUT FUER ZELLCHEMIE MUNICH (WEST GERMANY)
REINIGUNG UND WIRKUNGSWEISE DER PYRUVATCARBOXYLASE AUS PSEUDOMONAS CITRONELLOLIS (PURIFICATION AND ACTION MECHANISM OF PYRUVATE CARBOXYLASE EXTRACTED FROM PSEUDOMONAS CITRONELLOLIS),
by Werner Seubert, and Ute Remberger. 11 Apr 61, 14p. Contract AF 61 (052)-251,

Unclassified report

Text in German, Summary in English.

Availability: Published in Biochemische Zeitschrift v334 p401-4 1961. Copies to DDC users only.

Descriptors: (*Pseudomonas, Carboxy-lyases), (*Pyruvates, Carboxy-lyases), Magnesium, Ions, Catalysis, Carbon dioxide, Vitamin B complex, Purification, Exchange reactions, Acetates, Bacteria, Mammals

Pyruvate carboxylase catalizes the Mg (++)-dependant carboxylation of pyruvate to oxalacetate. The enzyme has been purified 550 times from crude extracts of Ps. citronellolis. Biotin acts as the prosthetic group of the enzyme. By exchange studies with radioactive compounds a CO2-biotin-enzyme has been shown to participate in the carboxylation of pyruvate. In contrast to the mammalian pyruvate carboxylase the enzyme isol-

ated from bacteria catalizes the above reaction in the absence of acetyl CoA. The implication of this observation regarding possible different carboxylation mechanisms in bacterial and mammalian systems is discussed.

AD-632 652 Fld. 6/1, 6/16
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
LES SELS OSSEUX (BONE SALTS),
by M. J. Dallemagne, L. Richell, H. Herman, P. Francois, and C. Fabry. 1961, 62p. Contract AF 61 (514)-858,AF61 (514)-940
Unclassified report

Text in French.

Availability: Published in Bulletin de L'Academie Royale de Medecine de Belgique v1 (S7) n10 p749-808 1961. Copies to DDC users only.

Descriptors: (*Bone, Chemical analysis), Salts, Calcium compounds, Phosphates, Synthesis, Infrared spectroscopy, Teeth, Calcification, In vivo analysis, Radioactive isotopes, Histology, Reviews, Belgium

AD-631 885 See Fld. 6/16

AD-631 908 See Fld. 6/13

AD-631 916 See Fld. 6/16

AD-632 053 See Fld. 7/3

AD-632 074 See Fld. 6/13

AD-632 104 See Fld. 7/4

AD-632 192 See Fld. 6/16

AD-632 293 See Fld. 6/16

AD-632 324 See Fld. 6/5

AD-632 325 See Fld. 6/5

AD-632 326 See Fld. 6/5

AD-632 331 See Fld. 6/5

AD-632 651 See Fld. 7/4

6/2. BIOENGINEERING

AD-632 139 Fld. 6/2
CFSTI Prices: HC $2.00 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
BUMPUSHER - A POWERED AID TO LOCOMOTION.
Technical note,
by Serge J. Zaroodny. Sep 63, 40p. Rept. no. BRL-TN-1524,
Proj. RDT/E-1M10501A005
Unclassified report

Descriptors: (*Musculoskeletal system, Amplifiers), Human engineering, Humans, Strength, Power, Performance (Human), Motion, Beomechanisms, Engines + motors operation, Mechanics, Joints (Physiology), Legs

It is asserted that there exists an insufficiently - appreciated need for a simple device that would assist a man in his performance of the most exhausting part of the effort of walking, with a particular reference to carrying load uphill. Outlined are an analysis of the problem, and a possible construction of such a device. (Author)

6/3. BIOLOGY

AD-631 944 Fld. 6/3, 6/6
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
SEA URCHIN MITOSIS IN HIGH MAGNETIC FIELDS,
by Vernon R. Reno. 1 Feb 66, 21p. Rept. no. NAMI-954,
Contract NASA Order-R-39
NAVMED MR005.13-9010.1-9
Unclassified report

Descriptors: (*Echinodermata, Mitosis), Magnetic fields, Eggs, Oxygen, Nitrogen, Desoxyribonucleic acids, Biosynthesis, Magnetic properties

Mitosis in sea urchin eggs was retarded following their exposure to magnetic fields higher than 70,000 gauss which had gradients greater than 4200 gauss/centimeter. The degree of retardation was correlated simultaneously to both the field strength and the field gradient. Division delay in fields ranging from 100,000 to a maximum of 120,000 gauss was independent of the gradient. Differences in division delay were found which may be a reflection of the differential migration of oxygen and nitrogen due to their para- and diamagnetic properties. An hypothesis is given concerning the biochemical processes affected by magnetic fields. (Author)

AD-632 027 Fld. 6/3, 6/16
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
DATA ON COMPARATIVE MORPHOLOGY OF EXTERNAL EYE MUSCLE RECEPTORS IN VERTEBRATES,
by D. V. Burnasheva. Mar 66, 13p. Rept. no. T-450-R,
TT 66-61165
Unclassified report

Trans. of Ceskoslovenska Morfologie, v11 n1 p57-67 1963.

Descriptors: (*Vertebrates, Eye), (*Eye, Muscles), (*Muscles, Morphology (Biology)), (*End organs, Muscles), Nerves, Birds, Fishes, Reptiles, Amphibians, Reviews, Czechoslovakia, Canada

Data are given concerning only sensory nerve endings of external eye muscle receptors.

AD-632 045 Fld. 6/3, 5/10
UNIVERSITY COLL LONDON (ENGLAND)
LEARNING AND DISCRIMINATION IN THE OCTOPUS,
by J. Z. Young. 27 Mar 60, 68p. Contract AF 61 (052)-256,
AFOSR 2989
Unclassified report

Availability: Published in Biological Reviews v36 p32-96 1961. Copies to DDC users only.

Descriptors: (*Cephalopoda, *Learning), (*Visual perception, Cephalopoda), (*Touch, Cephalopoda), Memory, Brain, Great Britain

A description is given of experiments on the setting up of representations that promote or prevent attack by Octopus. The capacities of the animals for visual and tactile discrimination are then surveyed and the hypotheses put forward for the mechanism of these discriminations discussed. A survey was made of the effects of removal of the vertical lobe and the light that these experiments throw on the memory mechanism.

AD-632 046 Fld. 6/3, 5/10
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
THE DISCRIMINATION OF POLARIZED LIGHT BY OCTOPUS: A BEHAVIOURAL AND MORPHOLOGICAL STUDY,
by M. F. Moody, and J. R. Parriss. 15 Oct 60, 25p. Contract AF 61 (052)-256,
AFOSR 2991
Unclassified report

Availability: Published in Zeitschrift fuer Vergleichende Physiologie v44 p268-91 1961. Copies to DDC users only.

Descriptors: (*Cephalopoda, Vision), (*Visual perception, Light), Training, Photoreceptors, Polarization, Behavior, Morphology (Biology), Great Britain, Optical properties, Retina, Reflection, Scattering, Molecular rotation

Groups of octopuses were trained to discriminate between different directions of the electric vector of plane polarized light coming from a small underwater torch. Clear discrimination was shown between vertical and horizontal, and between 45 deg. and 135 deg. oblique directions of the electric vector. The discriminations probably involve specialised retinal photoreceptors, so some electron microscopical findings are presented concerning the structure of the receptor layer of the retina. The tubules of the two rhabdomeres on opposite sides of any one retinula cell are often approximately parallel, but those attached to different retinula cells can have quite different directions. Theoretical reasons are given for supposing that the rhabdomere tubules show dichroism; polarized light should be absorbed preferentially when its electric vector lies parallel to the long axis of a tubule. If the rhabdomeres do indeed show this dichroism, most of the receptor units of the octopus retina should give different responses for different directions of the electric vector of polarized light. This hypothesis is shown to be consistent with both the observed discriminations and the fine structure of the receptor layer of the retina. (Author)

AD-632 047 Fld. 6/3, 5/10
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
EVIDENSE FOR THE INTRAOCULAR DISCRIMINATION OF VERTICALLY AND HORIZONTALLY POLARIZED LIGHT BY OCTOPUS,
by M. F. Moody. 16 May 61, 11p. Contract AF 61 (052)-256,
AFOSR 2990
Unclassified report

Availability: Published in J. Exp. Biol. v39 p21-30 1962. Copies to DDC users only.

Descriptors: (*Cephalopoda, Vision), (*Visual perception, Light), Polarization, Training, Photoreceptors, Tptical properties, Scattering, Great Britain

Four groups of octopuses (6 animals in all) were trained to discriminate between vertically and horizontally plane-polarized light. Two different sources of polarized light were used: a torch, and a disk of polaroid backed by white plastic. Half the octopuses were trained using the former source, and half using the latter. With each polarized light source, discrimination could be based on a reflexion or scattering pattern, but the extra-ocular cues would be different for the two sources. After training each octopus was shown, without reward or punishment, the polarized light source with which it was not trained. The aggregate score shows efficient transfer, and three of the four groups showed a significant preference for the new source when the plane of polarization was the same as that which they were trained to attack. It is concluded that the discrimination is not based on extra-ocular patterns, i.e. that the analysis of the polarized light occurs within the octopus's eye. (Author)

AD-632 048 Fld. 6/3, 5/10
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
THE VISUAL SYSTEM OF OCTOPUS.
by J. Z. Young, M. F. Moody, J. R. Parriss, and N. S. Sutherland. 1960, 24p. Contract AF 61 (052)-256 ,N62558-2453
AFOSR 2988
Unclassified report

Availability: Published in Nature v186 n4728 p836-44 Jun 11 1960. Copies to DDC users only.

Descriptors: (*Cephalopoda, Vision), (*Eye, Cephalopoda), (*Visual perception, Geometric forms), Retina, Learning, Cells (Biology), Cytology, Photoreceptors, Light, Polarization, Great Britain

Contents: Regularities in the retina and optic lobes of octopus in relation to form discrimination, by J. Z. Young; Discrimination of polarized light by octopus, by M. F. Moody and J. R. Parriss; Theories of shape discrimination in octopus, by N. S. Sutherland.

AD-632 090 Fld. 6/3, 5/10
CAMBRIDGE UNIV (ENGLAND)
SELECTION OF NEST MATERIAL BY FEMALE CANARIES,
by R. A. Hinde, and E. A. Steel. 31 Mar 61, 9p. Contract AF 61 (052)-97,

Unclassified report

Availability: Published in Animal Behaviour v10 n1-2 Reprint-242 p67-75 Jan-Apr 1962. Copies to DDC users only.

Descriptors: (*Birds, *Behavior), (*Materials, Selection), (*Hormones, Birds), Reproductive system, Females, Rhythm (Biology), Grasses, Feathers, Stimulation, Great Britain, Estrogens

Most birds use more than one type of material for the construction of their nests. Domesticated canaries, provided with grass and feathers, use primarily grass for the outer structure and feathers for lining the cup. The selection of material is governed at least in part by stimuli from the nest cup: experiments in which females were given small and large nest cups on alternate days showed that, at a given stage of reproductive development, they are more likely to carry feathers if building in a small cup. Considering the data for the two nest cups separately, the proportion of feathers carried increased as the date of egg laying approached. There was thus a gradual change in the selection of material as the reproductive cycle progressed, even when the stimuli available from the nest cup during the test were constant. The factors controlling this are considered.

AD-632 091 Fld. 6/3
CAMBRIDGE UNIV (ENGLAND)
TEMPORAL RELATIONS OF BROOD PATCH DEVELOPMENT IN DOMESTICATED CANARIES,
by R. A. Hinde. 26 May 61, 9p. Contract AF 61 (052)-97,

Unclassified report

Availability: Published in IBIS v104 p-90-7 1962. Copies to DDC users only.

Descriptors: (*Birds, Reproduction (Physiology)), (*Rhythm (Biology), Feathers), Time, Behavior, Stimulation, Females, Blood vessels, Edema, Great Britain

The paper is concerned with the brood patch of female domesticated canaries. An attempt has been made to trace the temporal course of brood patch development in some detail, and to assess its relationship with the changes in reproductive behaviour which occur as the breeding cycle progresses. The temporal relations between the loss of feathers, vascularization, nest-building, egg-laying and incubation indicate the extent to which these different aspects of reproductive development share causal factors. In order that such temporal correlations should be meaningful, it was necessary that they should be based on birds showing a reasonable variability in their reproductive cycles. This was ensured by providing sub-optimal breeding conditions: if canaries are not allowed to build nests, many of the females undergo a protracted reproductive development, and many of the clutches laid are not incubated. (Author)

AD-632 119 Fld. 6/3, 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ESISTENZA DI UN VERO RIFLESSO PUPILLARE CONSENSUALE NEGLI UCCELLI (THE EXISTENCE OF A TRUE CONSENSUAL PUPILLARY REFLEX IN BIRDS),
by G. Berlucchi, and P. Strata. 1961, 3p. Contract AF 61 (052)-107,
AFOSR 2828

Unclassified report

Availability: Published in Dal Bollettino della Societa' Italiana di Biologia Sperimentale v37 n18 p928-30. Copies to DDC users only.

Descriptors: (*Birds, Eye), (*Eye, Reflexes), Italy

AD-632 190 Fld. 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
THE RETINA OF CEPHALOPODS AND ITS DEGENERATION AFTER OPTIC NERVE SECTION,
by J. Z. Young. 13 Mar 61, 73p. Contract AF 61 (052)-256,
AFOSR 2992

Unclassified report

Availability: Published in Philosophical Transactions of the Royal Society of London v245 SerB n718 p1-58 Mar 1 1962. Copies to DDC users only.

Descriptors: (*Cephalopoda, Retina), Optic nerve, Excision, Nerve fibers, Nerve cells, Nuclei (Biology), Cell structure, Morphology (Biology), Degradation, Histology, Electrophysiology, Great Britain

Each retinal cell of Octopus carries a rhabdomere on two opposite faces. Rhabdomeres from four cells combine to make a square rhabdome. The cells are mainly arranged with their axes in approximately either the vertical or horizontal plane as the eye is usually held in the head. Counts show that there are about twice as many retinal cell nuclei as there are rhabdomes. There are altogether about 2 x 10 to the 7th power retinal cells in each eye, with a density of about 50000/mm sq. The retinal cells at the centre of the retina are longer and thinner than those at the periphery. There is a strip of longer, thinner cells running horizontally along the equator. These often have less pigment in their distal ends than do the cells dorsally and ventrally, but other distributions of the pigment are seen, depending on the previous illumination. There are several types and sizes of retinal cell and not all are associated in fours to make rhabdomes. The proximal segments carry fine collateral twigs, these interdigitate and may allow mutual interaction between neighbours. The main meshes of the retinal plexus are not formed by fibres of the retinal cells but by the axons of cells in the optic lobes, presumably efferents. After severing the optic nerves to any region of the retina all the retinal cells undergo retrograde degeneration, leaving only the supporting cells intact. (Author)

AD-632 274 Fld. 6/3, 6/4
CFSTI Prices: HC $1.10 MF $0.50
MAX-PLANCK-INSTITUT FUER BIOLOGIE TUEBINGEN (WEST GERMANY)
FINAL REPORT 1 APRIL 1959 TO 31 DECEMBER 1961,
by Werner Reichardt. 31 Dec 61, 2p. Contract AF 61 (052)-232,
AFOSR 434?

Unclassified report

Descriptors: (*Cybernetics, Neurology), (*Insects, Brain), (*Electroretinography, Insects), Equilibrium, Eye, Histology, Arthropods, Central nervous system, Electrophysiology, Vision, Bionics, West Germany

A series of conferences was held to study the following problems: (1) Application of cybernetic analysis to neurological problems of equilibrium; (2) Electroretinogram of the insect eye; and (3) Histology and function of the insect brain. Visits were made to laboratories in the United States to discuss cybernetic approaches to problems in neurobiology and their application to the design of machines.

AD-632 342 Fld. 6/3
LOS ANGELES COUNTY MUSEUM CALIF
A NOTE ON THE NESTING OF THE EASTERN PACIFIC RIDLEY SEA TURTLE, LEPIDOCHELYS OLIVACEA,
by David K. Caldwell, and Richard S. Casebeer. 1963, 1p. Contract DA-MD-49-193-63-G94,

Unclassified report

Prepared in cooperation with University of Southern California, Los Angeles. Dept. of Biological Sciences.

Availability: Published in Herpetologica v20 n3 p213 Sep 18 1964. Copies to DDC users only.

Descriptors: (*Reptiles, Reproduction (Physiology)), Eggs, Periodic variations, Costa Rica

AD-632 380 Fld. 6/3
CFSTI Prices: HC $2.00 MF $0.50
MARYLAND UNIV COLLEGE PARK
TICKS,
by Carleton M. Clifford, and George Anastos. 1965, 40p. Contract DA-49-007-MD-981,

Unclassified report

Descriptors: (*Ticks, Morphology (Biology)), Congo (Leopoldville), Distribution, Identification, Ecology, Birds, Mammals, Reptiles, Rodents, Parasites, Life cycle

The extensive collection of ticks was made from 1949 -1952 by the mission of H. De Saeger to the National Park of Garamba which is located in the northeastern portion of the Congo near the border of the Sudan. In all, 24 species, comprising 7 genera, are recorded from Garamba Park. All these species but one, Argas arboreus, have been recorded previously from the Congo. Many of the collections were from rodent nests and several fully engorged nymphs were recovered. In certain instances it was possible to dissect away the nymphal skins and determine the almost fully developed adults inside. This method permitted description of the nymphs of Rhipicephalus pseudolongus, R. senegalensis, and R. simpsoni. The nymph of Dermacentor rhinocerinus is also described, but the identification of nymphs of this species is based on association with the adults and not on the opening of nymphal skins. The report gives information on the distribution, hosts, and taxonomic status of each species. All of the localities are either in the park itself or in adjacent areas.

AD-631 877 See Fld. 6/16

AD-632 019 See Fld. 6/1

AD-632 114 See Fld. 6/16

AD-632 127 See Fld. 6/1

AD-632 191 See Fld. 6/16

AD-632 192 See Fld. 6/16

AD-632 267 See Fld. 6/1

AD-632 272 See Fld. 6/1

AD-632 273 See Fld. 6/1

6/4. BIONICS

AD-632 025 Fld. 6/4, 6/6
CFSTI Prices: HC $1.10 MF $0.50
COMITATO NAZIONALE PER LE RICERCHE NUCLEARI NAPLES (ITALY)

ANNUAL SUMMARY REPORT MAY 1 1959-APRIL 30 1960,
by Valentino Braitenberg. 30 Apr 60, 7p. Contract AF 61 (052)-96,
AFOSR TN-60-713
Unclassified report

See also AD-215 229, -215 230, -262 253.

Descriptors: (*Cybernetics, Scientific research), (*Nerve cells, Scientific research), Laboratories, Cerebellum, Morphology (Biology), Reflexes, Cerebral cortex, Fishes, Bovines, Electrophysiology, Histology, Nervous system, Physiology, Italy

Effort was mainly devoted to the development of a 'Laboratory of Cybernetics' within the 'Scuola di Perfezionamento in Fisica Teorica e Nucleare' of the University of Naples. The laboratory was planned for experimental work connected with the development of cybernetic theories about the working of neuron assemblies. Specific projects include (1) how a timing mechanism in the cerebellum may be employed in the control of voluntary movements, (2) morphological observations on the optic tectum of teleosts, (3) attempts at a mathematical characterization of an area of undifferentiated cortex in man, and (4) measurements on dendrites of the cerebral cortex of Bos taurus.

AD-632 544 Fld. 6/4, 6/16
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
IMPLICATIONS FOR ELECTROPHYSIOLOGY OF A MODEL OF GLOBAL FUNCTION USING SIMPLE SIMULTANEITY.
Physical sciences research papers,
by Harry Blum. Apr 66, 14p. Rept. no. AFCRL-PSRP-214,AFCRL-66-242
Proj. AF-5632, Task 563205,
Unclassified report

Availability: Published in Symposium on the Analysis of Central Nervous System and Cardiovascular Data Using Computer Methods, NASA SP-72, p293-302, October 29-30, 1964. Copies to DDC users only.

Descriptors: (*Central nervous system, *Bionics), (*Perception, Bionics), Brain, Electroencephalography, Physiology, Models (Simulation), Computers, Artificial intelligence, Adaptive systems

An attempt is made to understand and formalize the global function of the central nervous system using a memory built of autonomous omnidirectional transmitter-receiver elements (transponders) distributed in a volume. In the simplest formulation, all elements broadcast signals consisting of a single pulse, which propagates with a uniform finite velocity throughout the volume. If such a system of elements is synchronized in its firing, or has some equivalent of synchronization, connection can be made to the points of simultaneous arrival of pulses. By changing such simultaneity points from transmissive point to transponder points, joint attributes can be represented. This leads to a geometric structuring of information in which distance is irrelevant but equidistance precisely relevant. This allows arbitrary connection of attributes without regard to distance and without making all possible preconnections. While such systems can operate well with few elements firing at once, they saturate quickly with complexity due to the 'combinatorial' accumulation of accidental simultaneity points. (Author)

AD-632 599 Fld. 6/4, 9/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
CYBERNETICS IN EUROPE AND THE U. S. S. R. ACTIVITIES, PLANS, AND IMPRESSIONS.
Scientific rept.,
by Rowena W. Swanson. Mar 66, 51p. Rept. no. AFOSR-66-0579,
Proj. AF-9769,
Unclassified report

Prepared for presentation at IEEE Convention, New York, 21-25 Mar. 66, session 7, Cybernetics.

Descriptors: (*Cybernetics, History), Eastern Europe, Western Europe, USSR, Great Britain, West Germany, France, Italy, Czechoslovakia, Hungary, Poland, Yugoslavia, Data processing systems, Control systems

The paper considers, in a preface and opening section, the scope and meaning of the term, cybernetics. In the defined context, cybernetics activities in England, Germany, France, Italy, the U.S.S.R., and several East European countries are discussed. The paper concludes with comments on national policies and resources and on practices established and being established to aid communication across national boundaries. A bibliography is included to bibliographies and conference proceedings in areas of interest to cybernetics. Three appendices provide: (a) tables of contents of translations of U.S.S.R. periodicals in cybernetics areas of interest, (b) a guide to JPRS serials on U.S.S.R. activities in cybernetics, and (c) a commentary on libraries, librarians, and document retrieval. (Author)

AD-632 184 **See Fld. 9/2**

AD-632 274 **See Fld. 6/3**

6/5. CLINICAL MEDICINE

AD-631 905 Fld. 6/5, 6/18
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
DETERMINATION OF STRONTIUM AND CALCIUM IN BONE BY X-RAY ABSORPTIOMETRY,
by A. Engstrom, C. Lagergren, and B. Lundberg.
15 Nov 56, 8p. Rept. no. TN-2,
Contract AF 61 (514)-861,
Unclassified report

Availability: Published in Experimental Cell Research v12 p592-8 1957. Copies to DDC users only.

Descriptors: (*Strontium, X ray absorption analysis), (*Calcium, X ray absorption analysis), Bone, X rays, Sweden

The use of the X-ray diffractometer for the determination of Sr in the presence of Ca is described. The X-ray absorptiometric technique permits the determination of as small concentrations of Sr as a few tenths of a per cent. A method for microradiography with a dispersed, continuous spectrum covering the absorption edge has been developed and 10 to the minus 6th power to 10 to the minus 8th power g of Ca can readily be determined. (Author)

AD-631 926 Fld. 6/5
CFSTI Prices: HC $7.60 MF $0.75
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
TECHNICAL REPORT COVERING THE PERIOD 1 JUNE 1957 - 31 MAY 1959,
by M. J. Dallemagne. 31 May 59, 74p. Contract AF 61 (514)-1175,
AFOSR TN-59-636
Unclassified report

Descriptors: (*Bone, Phosphates), (*Teeth, Phosphates), (*Autoradiography, Bone), (*Phosphates, Infrared spectroscopy), Dentistry, Calcification, Crystal structure, Crystal growth, Calcium, Salts, Carbon, Carbonates, Carbon dioxide, Phosphorus, Labeled substances, Radioactive isotopes, Recrystallization, In vitro analysis, In vivo analysis, X-ray diffraction analysis, Diffusion, Magnesium, Fluorine, Experimental data, Belgium

Calcium, phosphorus and carbon isotope studies were made on biological and synthetic phosphates to compare the behaviour of these materials. Special attention was paid to remodelling of crystals. The high exchange values obtained for calcium exchange were reconsidered and interpreted. The mechanism of remodelling is discussed. Phosphorus exchange was also studied in total and mineralized bone. Labelled C02 exchange in bone and teeth give the demonstration that C02 is located in the bulk of the crystals but this location seems to depend on recrystallization phenomena. Physicochemical studies were performed on synthetic phosphates and bone or teeth mineral. When synthetic phosphates with various Ca/P ratios are treated by the methods used for the destruction of the organic phase of bone, the Ca/P ratio raises up to 2.14. Special attention was paid to the phonomenon called peptization of bone mineral. The influence of different factors which induce peptization was studied. Autoradiographic studies on bone slices were made: total bone and mineralized bone slices do not behave in a similar manner when suspended in vitro in a tagged calcium solution. Hot spots only appear when total bone is concerned. The signification of the classical autoradiographic picture obtained in vitro with total bone slices is discussed. Phosphorus behaves just like calcium and other compounds which are not present in bone are also located in hot spots. (Author)

AD-631 978 Fld. 6/5
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO)
KEEPING THE HEART ALIVE WITH A BIOLOGICAL BATTERY,
by O. Z. Roy, and R. W. Wehnert. 1956, 3p.
Rept. no. NRC-8872,
Unclassified report

Availability: Published in Electronics Mar 21 1966. Copies to DDC users only.

Descriptors: (*Heart, Mechanical organs), (*Mechanical organs, Batteries + components), Body fluids, Electrolytes, Implants, Zinc, Platinum, Silver, Silver compounds, Chlorides, Electrodes, Power supplies, Pulse rate, Voltage, Electrocardiography, Life expectancy, Canada

AD-631 982 Fld. 6/5
NAVAL MEDICAL RESEARCH INST BETHESDA MD
USE OF CARTILAGE AND BONE IMPLANTS IN RESTORATION OF EDENTULOUS RIDGES,
by Philip J. Boyne, and Donald E. Cooksey. 1963, 13p.
NAVMED MR005.02-0001.6-8
Unclassified report

Availability: Published in Journal of the American Dental Association v71 p1426-35 Dec 1965. Copies to DDC users only.

Descriptors: (*Implants, Tissues (Biology)), (*Bone, Implants), (*Cartilage, Implants), (*Teeth, Prosthetics), Freeze drying, Surgical techniques, Dentistry, Histology

Homogenous freeze-dried tissue implantation was combined with soft tissue ridge extension procedures to improve anatomically deficient edentulous ridges in a total of 27 cases. A novel approach to the implantation site was used in 8 of the 14 patients (a vertical incision leading to a subperiosteal tunnel). Four grafts were considered to be fair, four were good, and 19 were excellent from a long term (1-4 yrs.) clinical standpoint. The combination of compatible osseous and cartilagenous homografts with soft tissue ridge extension procedures would appear to be an effective surgical approach to deficient alveolar ridges. (Author)

AD-631 983 Fld. 6/5
CFSTI Prices: HC $1.00 MF $0.50
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
COMPARISON OF EPILEPTIC AND NON -EPILEPTIC PATIENTS ON THE BOURDON-WIERSMA STIPPLE TEST,
by Laverne C. Johnson, and Carol Roberts. Jan 66, 13p. Rept. no. 66-6,
NAVMED MR-005.12-2304
Unclassified report

Descriptors: (*Epilepsy, Diagnosis), Performance (Human), Psychomotor tests, Convulsive disorders, Performance tests, Psychometrics, Electroencephalography, Statistical analysis

The Bourdon-Wiersma Stipple Test was administered to 50 hospitalized Navy and Marine male enlisted personnel. The epileptic group consisted of 25 patients having a clinical diagnosis of convulsive disorder. The control group consisted of 25 orthopedic patients with no record of such disorder. The 2 groups were matched for age, education, and intelligence. There was no significant difference in performance between the two groups on any of the test variables. The inability of the stipple test to elicit a significant difference in performance between diagnosed epileptics and controls makes it questionable as a screening device to detect latent epilepsy as originally claimed. (Author)

AD-631 985 Fld. 6/5
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
RESOLUTION AND STABILITY IN THE AUTOSPECTRA OF EEG,
by David J. Hord, Laverne C. Johnson, Ardie Lubin, and Marion T. Austin. Jan 65, 7p. Rept. no. 65-3,
NAVMED MR005.12-2304
Unclassified report

Availability: Published in Electroencephalography and Clinical Neurophysiology v19 p305-8 1965. Copies to DDC users only.

Descriptors: (*Electroencephalography, Analysis), Resolution, Frequency, Computers, Sleep, Stability

The limits to which power spectral analysis can be used in EEG research are described in terms of resolution and stability. Often the full potential of a computer is not realized because the mathematical filters of the program are adjusted so that their resolving ability is similar to that of visual analysis. This results in the production of broad, uninformative frequency bands. Using a very fine resolution that is just within the limits of acceptable stability yields auto-spectrograms that distinguish stages of sleep. (Author)

AD-632 036 Fld. 6/5
CFSTI Prices: HC $3.00 MF $0.50
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
NATURE OF IMMUNE TOLERANCE BY MEANS OF SYNTHETIC POLYPEPTIDE ANTIGENS.
Rept. for 1 Nov 64-31 Oct 65,
by Felix Borek, and Yehudit Stupp. Jan 66, 52p. Rept. no. Scientific-2,
Contract AF-EOAR-22-64,
AFOSR 66-0721
Unclassified report

Descriptors: (*Peptides, Proteins), (*Proteins, Antigen-antibody reactions), (*Antigens + antibodies, Proteins), Rabbits, Tolerances (Physiology), Immunity, Israel, Amino acids, Guinea pigs

Investigations were made of the immune response to protein carriers and polypeptidyl proteins in rabbits made tolerant to polypeptidyl proteins. Partial tolerance to poly-DL-alanyl determinants can be induced in rabbits injected at birth with one poly-DL-alanyl protein and then challenged with a conjugate of the same determinant with a different carrier. For studies of tolerance in rabbits, rabbit serum albumin behaved differently from heterologous carriers. The specificity of tolerance is not identical with the serological specificity of an antigen. This was concluded from studies in which, in order to clarify the role of the carrier in the specificity of tolerance, rabbits were made tolerant to polyalanyl RNase, polyalanyl HSA and polytyrosyl HSA. When the carrier proteins were injected into the tolerant animals, most of them remained tolerant to the protein carrier, even though the enrichment of the proteins with the polypeptidyl determinants was very extensive. The immune response in guinea pigs to linear and multichain copolymers of two, three or four different amino acids including tyrosine, glutamic acid, alanine and lysine, was studied.

AD-632 094 Fld. 6/5
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
BIOELECTRICALLY CONTROLLED UPPER EXTREMITY PROSTHESES.
Review article,
by Christopher H. Dodge. 19 Apr 66, 42p. Rept. no. ATD-66-46,
TT 66-61190
Unclassified report

Summary trans. of portions of Tsentralnyi Nauchno-Issledovatelskii Institut Protezirovaniya i Protezostroyeniya Trudy (USSR) n10 (14) 1964. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Prosthetics, Electrophysiology), (*Neuromuscular transmission, Control systems), Arms, Hands, Circuits, Design, Muscles, Gears, Musculoskeletal system, USSR

Contents: Electronic circuits for multifunctional prostheses with bioelectric control; Modes of controlling multifunctional bioelectrical prostheses; Design requirements for a feedback scheme for sensing grasping force in bioelectrical prostheses; Distribution of mass in forearm prostheses; Investigation of the electrical activity of muscles when operating a 'TsNIIPP' arm prosthesis; Methods of testing miniaturized reducing gear assemblies; A hand for bioelectrically controlled prostheses; Servomotor drive for a prosthetic hand.

AD-632 142 Fld. 6/5, 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
PREMIERES APPLICATIONS NEUROPHYSIOLOGIQUES D'UNE METHODE PERMETTANT LE BLOCAGE ELECTIF ET REVERSIBLE DE STRUCTURES CENTRALES PAR REFRIGERATION LOCALISEE (FIRST NEUROPSYCHOLOGICAL APPLICATIONS OF A METHOD PERMITTING THE ELECTIVE AND REVERSIBLE BLOCKING OF CENTRAL STRUCTURES THROUGH LOCALIZED REFRIGERATION).
Technical note,
by M. Dondey, D. Albe-Fessard, and J. LeBeau. 26 Feb 62, 7p. Contract AF 61 (052)-103,
Unclassified report

Text in French.

Availability: Published in Electroencephalography and Clinical Neurophysiology v14 p758-63 1962. Copies to DDC users only.

Descriptors: (*Brain, Cooling), (*Cooling, Surgical techniques), (*Surgical techniques, Brain), Tissues (Biology), Nervous system, Physiology, Electroencephalography, In vitro analysis, In vivo analysis, Butane, Propanes, Electrophysiology, Thalamus, Cerebral cortex, Histology, Cats, France

A technique for local cooling of deep structures has been applied to block the somesthetic thalamic relay in cats. It utilizes the expansion of a compressed gas at the tip of a probe. Isotherms have been determined in vitro. The time course of temperatures could be traced in vivo for points at various distances from the probe by means of stereotaxic placement of thermocouples and for different durations of fluid expansion, using either butane or propane. Alterations of the transmission through the VPL nucleus have been monitored by recording the cortical evoked potentials at the level of SI; activity of the VPL was also recorded. The cortical potential vanished when the temperature in VPL fell below 20C and reappeared when it rose above 28C in VPL the response did not disappear until about 8C, after having displayed a phase of augmentation. The block of transmission thus produced was reversible. Histological controls revealed no tissue damage provided the temperature had not fallen lower than 0C, whereas a more intense cooling resulted in extensive lesions in the tissue around the probe. (Author)

AD-632 199 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
HYPOKALEMIC PERIODIC PARALYSIS. ELECTROMICROSCOPIC CHANGES IN THE SARCOPLASM,
by Edward L. Howes,Jr., Harold M. Price, Carl M. Pearson, and Joe M. Blumberg. 1966, 16p. Proj. DA-3A012501-B813,
Unclassified report

Prepared in cooperation with California Univ., Los Angeles, Center for Health Sciences.

Availability: Published in Neurology v16 n3 p242-56 Mar 1966. Copies to DDC users only.

Descriptors: (*Musculoskeletal diseases, Histology), (*Potassium, Deficiency diseases), Paralysis, Muscles, Electron microscopy, Pathology, Electrolytes (Physiology), Histological techniques, Morphology (Biology), Glycogen, Metabolism

Skeletal muscle from a case of hypokalemic periodic paralysis has been studied principally by electron microscopy. An unusual clinical feature was profound, continuous, myopathic weakness. Histologically, the main findings were vacuolization and degenerative changes of most muscle fibers. The vacuoles appeared to arise initially from dilatations of lateral cisterns of the longitudinal component of the sarcoplasmic reticulum. By further enlargement and subsequent fusion, large vacuoles, many sarcomeres in length, were formed. Considerable morphologic evidence of a disturbed glycogen metabolism was presented. The morphologic alterations were discussed in terms of possible disturbances in excitation-contraction coupling or carbohydrate metabolism, or both, particularly with respect to glycogen. (Author)

AD-632 201 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
NODULAR FASCIITIS OF THE EYE AND ADNEXA,
by Ramon L. Font, and Lorenz E. Zimmerman. 2 Sep 65, 8p. Contract PHS-5-Ti-NB-5379-04,
Unclassified report

Availability: Published in Arch Ophthal v75 p475-81 Apr 1966. Copies to DDC users only.

Descriptors: (*Eye, Pathology), (*Neoplasms, Eye), Histology, Diagnosis, Connective tissue, Face, Tissues (Biology), Therapy, Excision, Etiology, Ophthalmology

Nodular fasciitis, a lesion with distinctive histopathologic characteristics occurring in the subcuta-

neous and fascial tissues, may be encountered in the eyelid and eyebrow, on the eyeball, and in the periorbital tissues. Ten such cases involving patients 3 to 81 years of age are recorded. The etiology is unknown, but the lesion is believed to be a reactive non-neoplastic proliferation of connective-tissue elements. Simple excision is sufficient therapy, and the prognosis is excellent. (Author)

AD-632 204 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
PATHOLOGY OF EXTRAPYRAMIDAL DISEASES,
by Kenneth M. Earle, Lysia Saxe Forno, J. Olszewski, Anna Ottolenghi, and Angel Pentschew. 1963, 27p.

Unclassified report

Availability: Published in The Symposium on Parkinson's Disease (2nd) Suppl. to Journal of Neurosurgery) pt2 p246-71 Jan 1966. Copies to DDC users only.

Descriptors: (*Nervous system diseases, Pathology), (*Paralysis, Nervous system diseases), Diseases, Central nervous system, Physiology, Histology, Brain, Diagnosis, Etiology, Nerve cells, Nerve fibers, Morphology (Biology), Biopsy, Histological techniques, Enzymes, Metabolism, Mental disorders, Symposia

Contents: Heterogeneous system degeneration; Regrouping of the extrapyramidal diseases as suggested by manganese encephalopathy; Brain biopsy and histopathology of extrapyramidal disease; Pathological changes associated with stereotactic lesions in Parkinson's disease; A normal characteristic component of the globus pallidus; Pathology of Parkinsonism.

AD-632 250 Fld. 6/5
CFSTI Prices: HC $1.00 MF $0.50
SASKATCHEWAN UNIV SASKATOON DEPT OF PHYSIOLOGY AND PHARMACOLOGY
PRECIPITIN RESPONSE TO HUMAN SERUM BY A RABBIT POPULATION. COMPARISON OF STRESSES ON SECONDARY PRECIPITIN RESPONSES.
Rept. for May 61-Jun 64,
by G. Bonar Sutherland, and W. G. Glenn. Apr 66, 11p. Contract AF 41 (657)-384, Task 775301,
SAM TR-66-27

Unclassified report

Descriptors: (*Immunology, Stress (Physiology)), (*Antigens + antibodies, Stress (Physiology)), Blood serum, Immunity, Radiation effects, Immune serums, Whole body irradiation, High altitude, Simulation, Spleen, Excision, Dosimeters, Canada

The report analyzes the secondary precipitin response of a population of rabbits subjected to various stresses and stress combinations. As administered in this experiment, the following stresses and stress combinations produced a statistically significant depression of precipitin production (compared to controls) during the anamnestic response of rabbits to a complex antigen (human serum). These are rank-ordered with the stress producing the greatest effect at the head of the list: 6-mercaptopurine; 800 r whole-body gamma radiation immediately followed by 10 days at a simulated altitude of 15,000 ft.; splenectomy followed 21 days later by 800 r of gamma radiation; 800 r whole-body gamma radiation or 15,000-ft. simulated altitude for 10 days followed by 800 r whole-body gamma radiation; and splenectomy. The following stresses showed no significant effect: 15,000-ft. simulated altitude during the induction period; 15,000-ft. simulated altitude for 10 days before the induction period; major surgery involving implantation of dosimeters. Whole-body gamma radiation (800 r) immediately followed by 15,000-ft. simulated altitude resulted in a mortality of 58% within the first 48 hours of decreased atmospheric pressure. Altitude exposure before 800 r gamma radiation did not indicate any synergism or antagonism related to the anamnestic response. Stress did not appear to increase antibody levels in the absence of a booster injection. (Author)

AD-632 317 Fld. 6/5, 6/13
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
DURATION OF PASSIVE IMMUNITY TO BOTULINUM TOXIN OFFERED BY ANTITOXIN IN MICE AND RABBITS.
Rept. for Sep-Dec 63,
by Paul Cresthull, James W. Crook, and Fred W. Oberst. Nov 65, 25p. Rept. no. CRDLR-3330, Proj. DA-1C622401A097,

Unclassified report

Descriptors: (*Immunity, Clostridium botulinum), (*Clostridium botulinum, Toxins + antitoxins), Parenteral infusions, Blood serum, Lethal dosage, Serodiagnosis, Mortality rates, Mathematical models, Time studies, Tables, Mice, Rabbits

Various doses of botulinum antitoxin, types A and B, were administered to mice and rabbits by the intraperitoneal and intravenous routes. The persistence of a passive immunity to the type A toxin was determined by (1) administering challenge doses of the toxin at various times after the antitoxin and (2) determining the median lethal ratios (LR50's) of toxin:antitoxin (MU:u) that produced a 50% mortality rate at each challenge time. Decreases in LR50 with time reflect the fall in amount of antitoxin in the blood of the animals and decreased passive immunity to the toxin. A graph prepared from the data represents a mathematical model of mortality frequency distribution in mice and rabbits after 500 MU of toxin. Passive immunity declines steadily with time; however, a sufficiently large dose of antitoxin in mice can produce passive immunity lasting for at least 49 days. (Author)

AD-632 324 Fld. 6/5, 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) SECTION OF CHEMICAL IMMUNOLOGY
IMMUNOGENICITY AND ROLE OF SIZE: RESPONSE OF GUINEA PIGS TO OLIGOTYROSINE AND TYROSINE DERIVATIVES,
by Felix Borek, Yehudit Stupp, and Michael Sela. 22 Jun 65, 2p. Contract AF-EOAR-22-64,

Unclassified report

Supported in part by NIH.

Availability: Published in Science v150 n3700 p1177-8 Nov 26 1965. Copies to DDC users only.

Descriptors: (*Tyrosine, Antigen-antibody reactions), (*Antigen-antibody reactions, *Peptides), Polymers, Guinea pigs, Antigens + antibodies, Israel, Guinea pigs, Immunology

Guinea pigs injected with 100 micrograms of p-azobenzenearsonate derivatives of hexa-L-tyrosine, tri-L-tyrosine, or N-acetyl-L-tyrosine amide, in complete Freund's adjuvant, developed, after 10 to 19 days, delayed-type hypersensitivity to these substances. This was shown by skin reactions, followed by the formation of circulating antibodies that were detectable by passive cutaneous anaphylaxis. Experiments with p-azobenzenearsonate-hexa-L-tyrosine labeled with iodine-131 showed that this substance was bound in vitro to proteins of normal guinea pig serum. Binding was similar with the nonantigenic hexa-L-tyrosine and its p-azobenzoate derivative. (Author)

AD-632 325 Fld. 6/5, 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) SECTION OF CHEMICAL IMMUNOLOGY
RELATION BETWEEN OPTICAL CONFIGURATION AND IMMUNOGENICITY OF SYNTHETIC POLYPETIDES,
by F. Borek, Yehudit Stupp, Sara Fuchs, and M. Sela. 21 Dec 64, 6p. Contract AF-EOAR-22-64,

Unclassified report

Supported in part by NIH.

Availability: Published in Biochem. J. v96 p577-82 1965.x Copies to DDC users only.

Descriptors: (*Peptides, *Antigen-antibody reactions), Copolymers, Amino acids, Tyrosine, Glutamic acid, Rabbits, Guinea pigs, Sensitivity, Propionic acid, Israel

Three random linear copolymers composed of two or three of the amino acids D-tyrosine, D-glutamic acid, D-alanine and D-lysine, and a branched multichain copolymer with a poly-D-lysine backbone and polymeric side chains of D-tyrosine and D-glutamic acid, were found to be non-antigenic in rabbits, by precipitin and passive cutaneous anaphylaxis, and in guinea pigs, by delayed hypersensitivity tests. The corresponding four copolymers of L-amino acids were shown to be antigenic by all the three criteria. No immunological cross-reactions were observed between the polypeptides composed of D-amino acids and the corresponding L-amino acid copolymers. Similarly, an azobenzenearsonic acid conjugate of poly-D-tyrosine was shown to be non-antigenic in guinea pigs, in contrast with an analogous conjugate of poly-L-tyrosine. Animals sensitized with the conjugate of poly-L-tyrosine did not exhibit delayed skin reactions, when cross-tested with the D-conjugate. A linear polymer composed of D-tyrosine, L-glutamic acid and L-alanine was found to be immunogenic and to cross -react with the corresponding polymer composed exclusively of D-amino acids. (Author)

AD-632 326 Fld. 6/5, 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
SPECIFICITY OF DELAYED REACTIONS TO HAPTEN -POLYPEPTIDE CONJUGATES,
by Felix Borek, and Yehudit Stupp. 20 Feb 65, 6p. Contract AF-EOAR-22-64,

Unclassified report

Availability: Published in Immunochemistry v2 p323-8 1965. Copies to DDC users only.

Descriptors: (*Antigen-antibody reactions, *Peptides), Immunity, Sensitivity, Antigens + antibodies, Serum albumin, Complex compounds, Israel, Guinea pigs

Guinea pigs senitized with p-azobenzenearsonate conjugates of polytyrosine, poly Lys51Tyr49, poly Glu52Tyr48 and poly Ala34Glu36Tyr30, showed delayed cross-reactions with p-azobenzenearsonate conjugate of bovine serum albumin. When conjugates of polypeptides containing other haptens such as p-azobenzoate, p-azobenzenesulfonate and p-nitrophenylazo were used as senitizing antigens, no delayed cross-reactions were observed with the corresponding hapten-bovine serum albumin conjugates, in conformity with the carrier -specificity known to exist in most delayed hypersensitivity reactions. (Author)

AD-632 331 Fld. 6/5, 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) SECTION OF CHEMICAL IMMUNOLOGY
COMPETITION OF ANTIGENIC DETERMINANTS,
by Israel Schechter. 20 Apr 65, 3p. Contract AF-EOAR-22-64,

Unclassified report

Availability: Published in Biochimica et Biophysica Acta v104 p303-5 1965. Copies to DDC users only.

Descriptors: (*Antigen - antibody reactions, Interference), (*Peptides, Antigen - antibody reactions), Proteins, Antigens + antibodies, Rabbits, Immunology, Israel

Interference in the immune response between peptide determinants is reported. Polypeptidyl proteins were used as immunogens, and antibody to the polypeptidyl moiety was measured by using for precipitation a polypeptidyl protein in which the protein moiety was incapable of reacting with any antibody formed. Thus, in the system employed the competing determinants are chemically defined and molecular parameters of the immunogens may be varied by changing either the peptides or the protein carrier.

AD-632 389 Fld. 6/5, 5/10
NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT SAN DIEGO CALIF
STABILITY IN PSYCHIATRIC DIAGNOSES FROM HOSPITAL ADMISSION TO DISCHARGE,
by Ransom J. Arthur, and E. K. Eric Gunderson.
Apr 66, 8p. Rept. no. 65-15,
NAVMED MF-022.01.03-9002
Unclassified report

Availability: Published in Journal of Clinical Psychology v22 n2 p140-4 Apr 1966. Copies to DDC users only.

Descriptors: (*Psychiatry, Diagnosis), Mental disorders, Hospitals, Stability, Therapy, Reliability, Psychoses, Neuroses, Behavior, Abnormal psychology, Military medicine

The stability or consistency of psychiatric diagnoses was studied in 512 consecutive admissions to the psychiatric services of two major naval hospitals. Concurrence in diagnostic classification from admission to discharge was determined for the 4 major diagnostic categories: Psychosis, Psychoneurosis, Character and Behavior Disorder, and Acute Situational Maladjustment. Diagnoses of Character and Behavior Disorder were found to be stable at both hospitals, while diagnoses of Psychosis and Psychoneurosis were low in agreement from admission to discharge at both hospitals. Stability and change in diagnosis were related to the patient's age, prescription of drugs, and disposition. Patients with stable diagnoses (Psychosis or Psychoneurosis) were older, were given drugs more frequently, and were more likely to be returned to duty or transferred for treatment at disposition than patients with unstable diagnoses. Individual psychiatrists showed similar patterns in changing diagnoses and in the factors related to no change. Changes in diagnosis were thought to be attributable to a combination of patient characteristics and administrative and dispositional policies rather than changes in the clinical status of patients. The data suggested that clinical phenomena may be given different weighting by clinicians depending upon certain demographic characteristics such as age and naval experience. (Author)

AD-632 502 Fld. 6/5
CFSTI Prices: HC $1.00 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
INCREASED CARIES RESISTANCE ASSOCIATED WITH HIGHER PAROTID FLUID FLOW RATE.
Final rept., Mar 63-Apr 65, 210 by Ira L.
by James M. Terry. Mar 66, 13p. Rept. no.
SAM-TR-66-20,
Task d775303,
Unclassified report

Descriptors: (*Saliva, Secretion), (*Teeth, Diseases), Dentistry, Fluid flow, Mouth, Resistance (Biological), Analysis of variance

Parotid fluid was collected from 3,786 healthy young adult males under conditions of very minimal stimulation. Subjects were divided into six DMFS categories, and the flow rate results were analyzed statistically. There was a statistically significant ($P < .025$) decrease in flow rate with increasing DMFS score. This significance was due to the higher rate of flow found for the 0-10 DMFS group and was not progressive through the other DMFS intervals. While no diagnostic significance can be attached to this observation, the higher rate of flow in minimally involved subjects was remarkably constant in the eight substudies included in this report. (Author)

AD-632 509 Fld. 6/5
CFSTI Prices: HC $1.00 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
THE PREPARATION OF PAROTID FLUID PROTEIN -FREE FILTRATES.
Final rept. Feb-Jun 65,
by A. Stewart Windeler,Jr., and Ira L. Shannon.
Mar 66, 11p. Rept. no. SAM-TR-66-25,
Task 775303,
Unclassified report

Descriptors: (*Saliva, Proteins), (*Proteins, Chemical precipitation), Chemical analysis, Acetic acids, Acetones, Copper compounds, Sulfates, Barium compounds, Hydroxides, Uric acid, Nitrogen, Measurement, Dentistry

The effectiveness of nine methods for precipitating protein in parotid fluid was investigated. Measurement was made of total nitrogen concentration and total protein concentration on the protein-free filtrates. Nitrogen measurements were performed by a semi-micro-Kjeldahl procedure and the proteins were measured by the Lowry method. Three methods were found to remove all of the protein: (1) An acetic acid in acetone method. (2) Somogyi's copper sulfate method. (3) Somogyi's barium hydroxide method. The two Somogyi methods removed uric acid in addition to the protein. (Author)

AD-632 584 Fld. 6/5
CFSTI Prices: HC $1.10 MF $0.50
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
CENTRAL NERVOUS MECHANISMS IN CIRCULATION REGULATION AND FUNCTIONAL DERANGEMENT (HYPERTENSION).
Annual summary rept. no. 1, 1 May 60-30 Apr 61,
by Cesare Bartorelli. 30 Apr 61, 10p. Contract
AF-61 (052)-253,
Unclassified report

See also AD-601 731.

Descriptors: (*Blood circulation, *Central nervous system), (*Hypertension, Central nervous system), Autonomic nervous system, Electroencephalography, Electrophysiology, Chemoreceptors, Sensory perception, Cardiovascular system, Pathology, Reflexes, Behavior, Blood pressure, Anoxia, Brain, Inhibition, Italy

Contents: Analysis of ascending, inhibitory and excitatory, mechanisms regulating autonomic and somatic hypothalamic activity and sham rage behavior; interrelationship between posterior hypothalamus, brain stem and cardiovascular afferents; and different brain stem contributions to circulatory control.

AD-632 626 Fld. 6/5, 6/12, 11/9
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) LABS OF AVIATION AND NAVAL MEDICINE
INTRODUCTION OF SOFT CANNULA INTO ARTERY BY DIRECT PERCUTANEOUS PUNCTURE,
by Per-Olof Barr, and Pekka Soila. 1959, 6p.
Contract AF 61 (052)-153,
Unclassified report

Availability: Published in Angiology v2 n3 pt1 p168-72 Jun 1960. Copies to DDC users only.

Descriptors: (*Arteries, Cannulation), (*Cannulation, Medical equipment), (*Medical equipment, Plastics), Skin, Polyethylene plastics, Nyon, Halocarbon plastics, Acetal plastics, Sweden

Methods of introducing a soft cannula into an artery by direct percutaneous puncture are discussed with consideration of suitable cannula materials. Conclusions from experiences gained during more than 100 punctures are reported. Suggestions are made concerning the use of polyethylene, nylon, and Teflon. (Author)

AD-631 953 See Fld. 6/19

AD-631 986 See Fld. 5/9

AD-632 293 See Fld. 6/16

AD-632 304 See Fld. 6/18

6/6. ENVIRONMENTAL BIOLOGY

AD-631 944 See Fld. 6/3

AD-632 025 See Fld. 6/4

AD-632 504 See Fld. 13/4

6/8. FOOD

AD-631 996 Fld. 6/8
CFSTI Prices: HC $3.00 MF $0.50
PILLSBURY MILLS INC MINNEAPOLIS MINN
FORMULATION AND FABRICATION OF FOOD BARS.
Final technical rept., 30 Mar 62-20 Mar 63,
by Jack R. Durst. Feb 66, 55p. Contract DA-19-129-QM-1970, Proj. DA-7x84-06-031,
USA-NLABS FD-39 ,USA-NLABS FD-66-29
Unclassified report

Descriptors: (*Military rations, Preparation), Food, Cereals, Beef, Binders, Dehydrated foods, Storage, Acceptability, Nutrition, Processing

Formulation, production and storage studies of food bars made from various cereal products (wheat flakes, oats, rice crispies and graham crackers), as well as beef, hash and soup type bars (split pea, potato flakes), are presented. The basic matrix for the food bars is a stable binder formulated from protein (sodium caseinate), fat (lard flakes), and carbohydrate (sucrose). The binder is spray -dried, admixed with the food component, and compressed into bar form. (Author)

AD-632 311 Fld. 6/8
CFSTI Prices: HC $4.00 MF $0.75
FMC CORP SANTA CLARA CALIF CENTRAL ENGINEERING LABS
INFILTRATION OF POROUS FOODS WITH HIGH CALORIC, NON-AQUEOUS, EDIBLE MATERIALS.
Final rept. 27 May 64-27 May 65,
by R. A. Lampi. Apr 66, 119p. Contract DA-19-129-AMC-84 (N), Proj. DA-7X84-06-033,
ANL TR-66-28-FD ,ANL FD-45
Unclassified report

Descriptors: (*Food, Impregnation), Porosity, Production, Processing, Flow charting, Freeze drying, Additives, Cereals, Meat, Preservation, Military rations, Density, Storage, Taste, Injection, Vacuum apparatus

Methods together with suitable high caloric formulations were developed for filling the voids of representative baked items and freeze dried meats, fruits and vegetables. Panel tests for acceptability and relevant physical, chemical and microbiological observations are reported for infiltered pro-

ducts stored for 4 months at a maximum temperature of 38C. Preparative experience was extrapolated into an engineering flow diagram for large scale production of infiltered foods. (Author)

AD-632 350 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
MIDWEST RESEARCH INST KANSAS CITY MO
FURTHER STUDIES ON THE DEVELOPMENT OF A NUTRITIONALLY ADEQUATE FALLOUT SHELTER RATION.
Final rept., pt. 2,
by H. E. Newlin, and G. L. Hayes. Mar 66, 21p. Contract OCD-PS-64-120, Proj. MR1-2769-B,
Unclassified report

See also AD-632 351.

Descriptors: (*Food, Fallout shelters), Nutrition, Bread, Carbohydrates, Analysis, Costs, Amino acids, Proteins

AD-632 351 Fld. 6/8
CFSTI Prices: HC $3.60 MF $0.50
MIDWEST RESEARCH INST KANSAS CITY MO
FURTHER STUDIES ON THE DEVELOPMENT OF A NUTRITIONALLY ADEQUATE FALLOUT SHELTER RATION.
Final rept., pt. 1, 26 Mar 64-31 Mar 66,
by Harrison E. Newlin, and Gene L. Hayes. Mar 66, 38p. Contract OCD-PS-64-120, Proj. 1300,MR1-2769-B Task 1310,
Unclassified report

Descriptors: (*Food, Fallout shelters), Nutrition, Bread, Civil defense systems, Dehydrated foods, Storage, Taste, Carbohydrates

Nutritional supplements were developed for consumption with presently available shelter rations. When consumed as directed, these supplements will supply all the nutritional factors recognized by the National Research Council as essential for the maintenance of adults. They will extend the use of shelter rations to shelter occupants who require special feeding, and to the general population, during the post-attack period. The supplements are of two types: unflavored compressed tablets; and dehydrated spreads, flavored so that they will enhance the palatability of ration biscuit, cracker, and wafer. Accelerated storage tests indicate that (a) the tablets have a high expected shelf life, and (b) the flavor of the spreads should be further stabilized. New mint-type and tableted granular starch carbohydrate supplements were developed, which are soft-textured and fully compatible with the mucous membranes of the oral cavity. (Author)

AD-632 580 Fld. 6/8
CFSTI Prices: HC $3.00 MF $0.75
GENERAL FOODS CORP WHITE PLAINS NY
STABLE BREAD STORABLE IN COLLAPSED STATE.
Rept. no. 3, Final, phase II, Aug 65,
by C. A. Kennedy. Apr 66, 84p. Contract DA-19-129-AMC-142 (N), Proj. DA-1K-643303-D-548,
USA-NLABS TR-66-32-FD ,FD 41
Unclassified report

Descriptors: (*Dehydrated foods, Processing), (*Bread, Freeze drying), Compressive properties, Storage, Moisture, Dehydration, Preservation, Tests, Degradation, Food

The report describes a process by which full moisture baked goods can be freeze compressed and freeze dried. The compressed dry form is immersed in water to rehydrate and expand to resemble the flesh counterpart. Successful application was made to sliced white bread, sponge cake, devil's food cake and waffles. Sliceable jelly and peanut butter were formulated which were combined with the prior processed compressed bread to make complete compressed sandwiches. Difference testing of compressed bread indicated similarity to a control bread with respect to appearance and flavor with tbure of the exp8ymental classified as being slightly moist. Storage testing of the various compressed prototypes was conducted at 70F., under cycling conditions of 0F. to 7070F. and at 100F. No appreciable c0ange was noted at the 70F. and cycling storage conditions for periods up to six months. Deterioration did occur at 100F. which requires further investigation. (Author)

AD-632 360 See Fld. 6/18

AD-632 581 See Fld. 9/2

6/10. INDUSTRIAL (OCCUPATIONAL) MEDICINE

AD-632 582 See Fld. 6/20

6/12. MEDICAL AND HOSPITAL EQUIPMENT AND SUPPLIES

AD-631 918 Fld. 6/12, 6/16
CFSTI Prices: HC $1.10 MF $0.50
OXFORD UNIV (ENGLAND) RADCLIFFE INFIRMARY
RESEARCH ON THE DYNAMICS OF PULSATILE BLOOD FLOWS IN THE HUMAN PULMONARY ARTERIAL SYSTEM.
Final technical rept., 1 Apr 58-31 Mar 59,
by G. de J. Lee, F. D. Stott, and R. M. Marshall. 31 Mar 59, 7p. Contract AF 61 (052)-65,
Unclassified report

Descriptors: (*Blood circulation, *Lungs), (*Flowmeters, Blood circulation), Arteries, Dynamics, Measurement, Blood pressure, Medical equipment, Pneumatic servomechanisms, Design, Great Britain, Humans

An apparatus was designed to combine continuous blood flow measurement with continuous pulmonary vascular pressure measurement in an attempt to investigate the pulsatile pressure-flow relationships in the pulmonary arterial system of man. A sensitive meter measuring gas flow directly employs a pneumatic amplifying system and is virtually drift free. The flow meter design is essentially a pneumatic servo mechanism maintaining a constant pressure within the plethysmograph. Changes in plethysmograph pressure are sensed by a sensitive diaphragm, movement of which is detected by a fine nozzle and pneumatic amplifier unit. Air is then supplied back to the plethysmograph by the amplifier output until the diaphragm position is restored. (Author)

AD-631 919 Fld. 6/12, 6/16
CFSTI Prices: HC $2.60 MF $0.50
OXFORD UNIV (ENGLAND) RADCLIFFE INFIRMARY
RESEARCH ON THE DYNAMICS OF PULSATILE BLOODFLOW IN THE HUMAN PULMONARY ARTERIAL SYSTEM.
Annual technical rept.,
by G. de J, R. M. Marshall, and F. D. Stott. Apr 60, 30p. Contract AF 61 (052)-65,
Unclassified report

Descriptors: (*Blood circulation, *Lungs), (*Flowmeters, Blood circulation), Blood pressure, Capillaries, Dynamics, Medical equipment, Design, Gas flow, Nitrogen compounds, Oxides, Arteries, Pneumatic devices, Great Britain, Humans

Development of an apparatus to enable continuous measurement to be made in man of pulmonary capillary blood flow with simultaneous intravascular pressure measurement was continued. A pneumatic flowmeter was built which is capable of continuously recording gas flow from a 1500 litre whole body perspex plethysmograph when a human subject within it inhales nitrous oxide gas. The gas uptake by the subject's lungs is proportional to the pulmonary capillary blood flow. The flowmeter has a linear response from 0 - 200 mls/second and a frequency response which is uniform to 5 cycles/second. (Author)

AD-631 920 Fld. 6/12, 6/16
CFSTI Prices: HC $3.60 MF $0.50
OXFORD UNIV (ENGLAND) RADCLIFFE INFIRMARY
RESEARCH ON THE DYNAMICS OF PULSATILE BLOODFLOW IN THE HUMAN PULMONARY ARTERIAL SYSTEM.
Technical rept.,
by A. J. Honour, G. de J. Lee, R. Marshall, and F. D. Stott. Sep 61, 35p. Contract AF 61 (052)-65,
Unclassified report

Descriptors: (*Blood circulation, *Lungs), (*Flowmeters, Blood circulation), Blood pressure, Medical equipment, Arteries, Pneumatic servomechanisms, Humans, Gas flow, Capillaries, Great Britain, Dynamics

The development of an apparatus to enable continuous measurement of pulmonary capillary bloodflow to be made in man during simultaneous intravascular pressure measurements was completed. A pneumatic flowmeter was made for use with the whole body plethysmograph. This instrument can rapidly record the rate of change of gas volume occurring within the plethysmograph as a result of gas exchange taking place within the lungs of a human subject lying within the chamber. The device consists essentially of a pneumatic servo system which detects any change in ambient pressure inside the body plethysmograph and appropriately injects or extracts air from the plethysmograph to restore the initial pressure state within the chamber. The rate of injection or removal of air needed to accomplish this is recorded by a standard electromanometer measuring the pressure change that develops across a linearly calibrated resistance graticule on the servo's feedback line to the plethysmograph. In its finally designed form the plethysmograph-flowmeter system has a uniform frequency response from 0-12 cycles per second and a linear range from 0-200 mls. per second. Instrument design and development was completed in November 1960. (Author)

AD-632 457 Fld. 6/12, 1/3, 6/19
CFSTI Prices: HC $3.00 MF $0.75
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ
AIRCRAFT LITTER RETENTION SYSTEM DESIGN CRITERIA.
Final technical rept.,
by Langston W. T. Weinberg. Apr 66, 67p.
Rept. no. AvSER-65-13,
Contract DA-44-177-AMC-254 (T), Task 1P125901A14230,
USAAVLABS TR-66-27
Unclassified report

Descriptors: (*Medical equipment, *Aviation safety), Tensile properties, Design, Airborne, Aviation accidents, Crash injuries, Acceleration, Military requirements, Loading (Mechanics), Fastenings, Acceleration tolerance

Strength requirements of U. S. Army litter/patient retention systems as set forth in current military specifications were analyzed. The analysis was made in light of U. S. Army aircraft accident experience, the human tolerance to abrupt accelerations, and the forces and accelerations that may be anticipated in accidents involving litter-bearing military aircraft. The analysis revealed that the strength requirements quoted in current military specifications are considerably lower than (1) the upper limits of acceleration that can be tolerated by airborne litter occupants and (2) the typical forces and accelerations that are incurred in military aircraft accidents. These conclusions indicat-

ed that current litter systems would fail under relatively moderate impact conditions and would thus subject the litter patient to amplified accelerations and increased contact injuries. The existing litter system was analyzed in detail to determine if minor modifications could be made to achieve a vertical load-carrying capability of 20G. Since this strength was not attainable, an experimental litter system designed for a 20G vertical and 25G longitudinal capability was developed. (Author)

AD-631 921 See Fld. 6/16

AD-632 626 See Fld. 6/5

6/13. MICROBIOLOGY

AD-631 908 Fld. 6/13, 6/1
CFSTI Prices: HC $1.10 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
SUMMARY OF RECENT ADVANCES IN X-RAY MICROCHEMICAL TECHNIQUES.
Technical note,
by Arne Engstrom. 1961, 3p. Rept. no. TN-3, Contract AF 61 (514)-861,
Unclassified report

Sponsored in part by grants from Swedish Medical Research Council and Rockefeller Foundation.

Descriptors: (*Cells (Biology), Microanalysis), (*X-ray photography, Cells (Biology)), (*X-ray diffraction analysis, Cells (Biology)), Radiography, Microscopy, X rays, Sweden

The development of X-ray analytical methods applicable to the study of problems in cell physiology has advanced considerably in recent years. One can distinguish between methods based on absorption, on diffraction and on emission of X-rays, and these three groups of techniques can now be applied to specimens in the micron range in size. In the present paper the most recent advances in X-ray micro-methods for cell chemical analysis will be briefly summarized. (Author)

AD-632 074 Fld. 6/13, 6/1
AGRICULTURAL UNIV WAGENINGEN (NETHERLANDS)
STRONGLY CAROTENOID-DEFICIENT CHROMATIUM -STRAIN D CELLS WITH 'NORMAL' BACTERIOCHLOROPHYLL ABSORPTION PEAKS IN THE 800-850 MILLIMICRON REGION,
by E. C. Wassink, and G. H. M. Kronenberg.
1962, 4p. Contract AF 61 (052)-270,
AFOSR 4183
Unclassified report

Availability: Published in Nature v194 n4828 p553-4 May 12 1962. Copies to DDC users only.

Descriptors: (*Pseudomonadales, *Carotenoids), Absorption spectrum, Chlorophylls, Bacteria, Culture media, Netherlands, Photochemistry

Carotenoid-deficient cells of Chromatium, strain D, were cultivated in cultures treated with DPA at a concentration of 12 mgm/l. It was shown that there is not necessarily any relation between disappearance of carotenoids and disappearance of the 850 millimicron bacteriochlorophyll maximum in chromatium, strain D.

AD-632 200 Fld. 6/13, 6/16
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
A MODEL FOR THE PURIFICATION OF VIRUSES FOR THE PRODUCTION OF SPECIFIC IMMUNE SERUM,
by Joseph F. Metzger, Chauncey W. Smith, and M. David Hoggan. 6 Aug 65, 4p.
Unclassified report

Availability: Published in Biochimica et Biophysica Acta v115 p230-2 (1966). Copies to DDC users only.

Descriptors: (*Viruses, Purification), (*Immune serums, Production), Separation, Hamsters, Antigen-antibody reactions

A technique described by Steere and Ackers (Nature v194 p114 1962) was used as the basis for the development of a feasible method of purifying a model virus system, equine abortion virus (EAV). After separation of the EAV from its protein menstruum, the purified antigen was used to produce an imune serum, which could be used in its homologous system without an immune response to the cellular elements.

AD-632 205 Fld. 6/13, 12/1
CFSTI Prices: HC $1.10 MF $0.50
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
BACTERIAL EXTINCTION TIME AS AN EXTREME VALUE PHENOMENON,
by Benjamin Epstein. Mar 66, 9p. Rept. no. ORC-66-8,
Contract DA-31-124-ARO-D-331,PHS-GM-9606
AROD 5307:10
Unclassified report

Descriptors: (*Bacteria, Life expectancy), (*Biometry, *Germicides), Stochastic processes, Effectiveness, Mathematical models

The theory of extreme values is shown to be relevant in the analysis of two stochastic biological phenomena. (Author)

AD-632 336 Fld. 6/13
CFSTI Prices: HC $2.00 MF $0.50
CHILE UNIV SANTIAGO DEPARTAMENTO DE VIROLOGIA
MECHANISM OF POLIOVIRUS MULTIPLICATION.
Annual technical rept. no. 1, 1 Jan-31 Dec 65,
by Siegmund Fisher, and Carmen Grado. Mar 66, 49p. Contract DA-ARO-49-092-65-G64, Proj. DA-2N0114501B71D-00-022-LA,
Unclassified report

Descriptors: (*Poliomyelitis virus, Ribonucleic acids), (*Ribonucleic acids, Synthesis), Antibiotics, Desoxyribonucleic acids, Genetics, Tissue culture, Enzymes, Labeled substances, Proteins, Biosynthesis, Membranes (Biology), Erythrocytes, Amino acids, Nerve cells, Cephalopoda, Tables, Chile

There is considerable inhibition of virus multiplication if AMD is added to HEp 2 cell prior to or together with the virus. This is not ascribable to permeability hindrance of viral penetration. In order to determine the mechanism of this inhibition, infected and non infected cells, treated or not with AMD, were pulse labeled with P32 or uracyl - C14, at various periods during their multiplication in spinner culture. The purified macromolecules were resolved on sucrose gradient centrifugation. The results showed that there is decrease of both the double and single stranded poliovirus like RNA, in the various time periods analyzed. RNA polymerase, RNA dependent, has been detected in poliovirus infected HEp 2 cells. Efforts have been made to purify this enzyme, and to analyze the requirements of the enzyme system. It has been found that two types of cell membranes are able to incorporate AA-C14. Some properties of this protein synthesizing system have been studied. (Author)

AD-632 023 See Fld. 6/1

AD-632 031 See Fld. 6/1

AD-632 032 See Fld. 6/1

AD-632 033 See Fld. 6/1

AD-632 034 See Fld. 6/1

AD-632 317 See Fld. 6/5

AD-632 628 See Fld. 6/1

6/14. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-632 241 See Fld. 5/5

6/15. PHARMACOLOGY

AD-631 886 Fld. 6/15
LONDON UNIV (ENGLAND)
AN ESERINE-LIKE ACTION OF CHLORAL HYDRATE,
by D. A. Brown. 6 Mar 62, 10p. Contract AF 61 (052)-25,
AFOSR 4194
Unclassified report

Availability: Published in British Journal of Pharmacology and Chemotherapy v19 n1 p111-9 Aug 1962. Copies to DDC users only.

Descriptors: (*Cholinesterase inhibitors, *Nerve impulses), (*CNS depressants, Nerve impulses), Ganglia, Autonomic agents, Acetylcholine, CNS stimulants, Skeletal muscle relaxants, Parasympathomimetic agents, Neuromuscular transmission, Great Britain

The intra-arterial injection of chloral hydrate potentiated the transmission of nerve impulses through the cat superior cervical ganglion, antagonized the ganglion-blocking action of hexamethonium, and greatly enhanced the ganglion-stimulant action of acetylcholine. Effects on the ganglion-stimulant actions of carbachol, nicotine, tetramethylammonium and potassium chloride were slight or absent. Chloral hydrate itself usually had no direct stimulant action. The neuromuscular-blocking action of tubocurarine on the isolated rat diaphragm preparation was completely and rapidly reversed by chloral hydrate. This reversal was prevented by previous treatment of the muscle with neostigmine. Chloral hydrate potentiated the actions of acetylcholine and nicotine on the isolated rabbit duodenum, and, in concentrations exceeding 1 mg/ml., produced a spasm which was abolished by hyoscine but not by mepyramine. It was concluded that these eserine-like effects were manifestations of an anticholinesterase action of chloral hydrate. Neither chloralose nor trichlorethanol showed evidence of this property. (Author)

AD-632 070 Fld. 6/15
AIX-MARSEILLE UNIV (FRANCE)
RECHERCHE D'UNE METHODE D'APPROACHE DE L'ACTION NEUROPHYSIOLOGIQUE DE DIVERSES DROGUES PSYCHOTROPES CHEZ L'HOMME (SEARCH FOR A METHOD OF STUDYING THE NEUROPHYSIOLOGICAL ACTION OF PSYCHOTROPIC DRUGS IN MAN),
by J. Paillard, J. Bert, J. Zwingelstein, and P. Giudicelli. 1961, 2p. Contract AF 61 (052)-95, AFOSR 1723
Unclassified report

Text in French; Attached Abstract in English.

Availability: Published in Revue Neurologique v104 n3 p227-8 1961. Copies to DDC users only.

Descriptors: (*Psychotropic agents, Nervous system), Neuromuscular transmission, Humans, Muscles, Tranquilizers, Reflexes, Nerves, Chlorpromazine, Electroencephalography, Motor reactions, France

A study of the action of various psychotropic drugs was undertaken by simultaneous recording of the EEG and reflex responses of the triceps

surae muscles set up by mechanical percussion of the tendon and electrical stimulation of the posterior tibial nerve. Three drugs were studied: Largactil, 20-28 MD Delalande, and Meprobromate. The most striking results were seen with 20-28 where in 13 subjects out of 14 the tendon reflexes were rapidly depressed. In 7 cases the Hoffmann reflexes (electrical stimulation) were also depressed although later. A reduction of the frequency of the EEG when seen (4 cases) occurs even later. The effects are less marked and less constant with largactil. A slowing of the frequency of the EEG is seen first (11 cases out of 15) then a depression of the tendon reflexes (1 cases) and afterwards a depression of the Hoffmann reflex (3 cases). The Meprobamate tended to increase the reactivity of the monosympatic reflex and also to increase the variability (8 cases out of 12). (Author)

AD-632 113 Fld. 6/15, 6/16
CFSTI Prices: HC $1.10 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
DISTRIBUTION OF BIOLOGICALLY ACTIVE COMPOUNDS IN THE BODY.
Final rept.,
by U. S. von Euler. 24 Mar 66, 9p. Contract AF-EOAR-52-65, Proj. AF-9777, Task 977701, AFOSR 66-0718

Unclassified report

Descriptors: (*Autonomic nervous system, Amines), (*Amines, Distribution), (*Levarterenol, Heart), Body, Pharmacology, Laboratory animals, Abstracts, Decaboranes, Sweden

Abstracts of the following papers are presented: Catecholamine depletion and uptake in adrenergic nerve vesicles and in rabbit organs after decaborane; Uptake of catecholamines in the rabbit heart after depletion with decaborane; Stereospecific catecholamine uptake in rabbit hearts depleted by decaborane; Refilling of noradrenaline stores in the prenylamine-depleted rabbit heart after injection of octopamine and tyramine; Catecholamines in nerve and organ granules; Adrenomedullary response to 2-deoxyglucose in the hypothyroid, euthyroid, and hyperthyroid rat; Effect of respiratory acidosis on vasoconstrictor effects of directly and indirectly acting sympathomimetic amines in cats; The adrenergic innervation of the vas deferens and the accessory male genital gland; Distribution and function of adrenergic nerves in the rabbit fallopian tube; Effects of acute heart failure and administration of ouabain on cardiac catecholamine uptake; Acceleration of noradrenaline turnover in the mouse heart by cold exposure; and Release of cardiac noradrenaline by decaborane in the heart-lung preparation of guinea pig.

AD-632 144 Fld. 6/15
HEIDELBERG UNIV (WEST GERMANY) PHARMAKOLOGISCHES INSTITUT
TESTIERUNG ANTIRHEUMATISCHER STOFFE AUF DER BASIS IHRES VERMUTLICHEN WIRKUNGSMECHANISMUS (EVALUATION OF ANTI-RHEUMATIC DRUGS BASED ON THEIR PRESUMABLE MECHANISM OF ACTION),
by Fritz Eichholtz, and Klaus Alexander. 1962, 23p. Contract AF 61 (052)-1006,

Unclassified report

Text in German, Summary in English.

Availability: Published in Arzneim.-Forsch. (Drug Res.) v11 p515-21 1961. Copies to DDC users only.

Descriptors: (*Rheumatic diseases, *Drugs), Analgesics + antipyretics, Corticosteroid agents, Salicylates, Salicylic acids, Pharmacology, Toxicity, Glucose, Metabolism, West Germany

Apart from the well-known anti-edematous and anti-phlogistic action, the following properties were observed: (1) Prednisolone: Marked stimulation of the sugar metabolism in the granulomatous tissue, re-polarizing, central analgetic, lissive, and local anaesthetic effects. (2) Phenylbutazone: Increase of sugar metabolism in the granulomatous tissue, re-polarizing, central analgetic, and lissive proterties. (3) Aminopyrine: Re -polarizing, central analgetic, spasmolytic, and lissive effects. (4) Sodium salicylate: Central analgetic, spasmolytic, and lissive effects. (5) Acetosalicylic acid: Re-polarizing, spasmolytic, and central analgetic effects.

AD-632 251 Fld. 6/15
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
THE EFFECTS OF 9-ALPHAFLUROHYDROCORTISONE ON THE DEHYDRATION DUE TO PROLONGED BED REST.
Summary rept.,
by Paul M. Stevens, and Theodore N. Lynch.
Dec 65, 10p. Rept. no. SAM-TR-65-285, Proj. AF-7755,

Unclassified report

Availability: Published in Aerospace Medicine v36 n12 p1151-6 Dec 1965. Copies to DDC users only.

Descriptors: (*Corticosteroid agents, *Metabolism), (*Dehydration, Chemotherapy), Body weight, Excretion, Sodium, Blood plasma, Fluorine compounds, Steroids, Ketones, Weightlessness

The study demonstrates that in the course of continuous bed rest for six days a significant loss of weight and plasma volume occurs. This is accompanied by hemoconcentration, increased urinary volume and sodium excretion. The administration of 9-Alphaflurohydrocortisone, during the last two days of bed rest increased body weight, decreased urinary volume and sodium excretion. The measured plasma volume increased and resulted in hemodilution. The potential uses of this form of therapy in individuals whose plasma volume is decreased secondary to prolonged bed rest and possibly weightlessness is discussed. (Author)

AD-632 555 Fld. 6/15
MARYLAND UNIV BALTIMORE DEPT OF SURGERY
THE MARFANIL MYSTERY.
Special publication,
by Carl Jelenko, Robert W. Buxton, Judith M. Jelenko, and Janice A. Mendelson. Apr 66, 13p. Contract OCD-PS-65-16, Proj. 1M012501A027, EASP 100-3

Unclassified report

See also AD-286 061.

Availability: Published in Surgery, Gynecology and Obstetrics, v122 p121-7 Jan 1966. Copies to DDC users only.

Descriptors: (*Chemotherapeutic agents, History), (*Clostridium perfrigens, Chemotherapeutic agents), Diseases, Chemotherapy, Wounds + injuries, Armed forces (Foreign), West Germany, East Germany

The purpose of the historical research was to attempt to determine why the German Army was issued 'Marfanil' (mafenide) as the topical agent of choice for use in contaminated wounds during World War II. The ordinary medical scientific literature contained some laboratory studies, but no clinical evidence or stated reason for this decision and it was thought that perhaps some useful information lay hidden in more obscure sources. The reasons for the German decision to use this drug were found in the records of the Nurnberg trials and proved to be more political than scientific despite the fact that more recent work has indicated that this is indeed a very useful antibacterial agent. (Author)

AD-631 881 See Fld. 6/16

AD-631 892 See Fld. 6/16

AD-632 019 See Fld. 6/1

AD-632 095 See Fld. 6/16

AD-632 098 See Fld. 6/16

AD-632 191 See Fld. 6/16

AD-632 612 See Fld. 6/16

AD-632 614 See Fld. 6/16

AD-632 616 See Fld. 6/16

AD-632 653 See Fld. 6/16

AD-632 654 See Fld. 6/16

6/16. PHYSIOLOGY

AD-631 876 Fld. 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
BIOPHYSICAL INVESTIGATIONS OF THE MINERAL PHASE IN HEALING FRACTURES,
by Ulf Nilsonne. 1959, 81p. Contract AF 61 (052)-21,

Unclassified report

Availability: Published in Acta Orthopaedica Scandinavica Suppl. 37 p1-80 1959. Copies to DDC users only.

Descriptors: (*Fractures (Bone), *Healing), Autoradiography, Salts, Bone, X-ray absorption analysis, Distribution, Minerals, Rats, Dogs, Sweden

The purpose of the investigation is to apply modern biophysical methods to the study of the rate and pattern of mineralisation in the healing of experimental fractures. The molecular configuration of the newly formed calcified tissues in the callus areas was analyzed.

AD-631 877 Fld. 6/16, 6/3
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
MYELINATION AND FUNCTION OF MAMMALIAN PERIPHERAL NERVES DURING EMBRYONAL DEVELOPMENT,
by R. K. Mishra, D. Ottoson, and L. Anggard.
1966, 1p. Contract AF 61 (052)-21,

Unclassified report

Availability: Published in Reprint. Copies to DDC users only.

Descriptors: (*Peripheral nervous system, *Embryos), Mammals, Embryology, Electrophysiology, Electron microscopy, Nerve fibers, Thresholds (Physiology), Sweden

A comparative electron-microscopical and electrophysiological investigation has been made on the relation between myelination and functional development of peripheral nerves during the gestation period. The study was carried out on sheep fetuses, the electrophysiological measurements usually being made on the sciatic nerve of the one side while that of the other side was used for the electron-microscopical examination. The preliminary observations indicate that the process of myelination does not begin until after approximately the 60th day. In the present material the earliest appearance of fully formed myelin was found in the nerve of a fetus with an estimated age of 80 days. The electrophysiological studies have brought evidence that the nerves are capable of conducting impulses before they become myelinated. Action potentials could thus be recorded from the sciatic nerve of fetuses in which the electron-microscopical investigation of the control nerve disclosed that

all fibres where essentially unmyelinated. Threshold measurements have shown that the nerves during this stage have a comparatively low threshold in view of their small diameters. Conduction velocities less than 1 m/sec were found. During the period from the 60th to the 80th day the nerve fibres appear to undergo a rapid functional development as revealed by an increase in conduction velocity and a fall in threshold. (Document quoted in its entirety.)

AD-631 878 Fld. 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
ANALYSIS OF SPINAL INTERNEURONS ACTIVATED BY TACTILE AND NOCICEPTIVE STIMULATION,
by G. M. Kolmodin, and C. R. Skoglund. 18 Jul 60, 19p. Contract AF 61 (052)-21, AFOSR 715
Unclassified report

Availability: Published in Acta Physiol. Scand. v50 p337-55 1960. Copies to DDC users only.

Descriptors: (*Nerve cells, *Stimulation), Inhibition, Touch, Cats, Sensation (Physiology), Pressure, Analysis, Hair, Motion, Pain, Sweden

The functional organization of spinal interneurons in the 6th and 7th lumbar segments responding exclusively to exteroceptive stimulation was studied in decapitate cats by means of intracellular technique. Seventy-six neurons were classified according to their responses to three types of skin stimuli, viz. touch/pressure, movement of hairs and nociceptive stimulation, into one main group responding to only one, and a second main group responding to two modalities of skin sensation. For each modality subgroup the excitatory and inhibitory response types, receptive fields, convergence patterns, discharge patterns and histological localization of the cells are described.The receptive fields were generally larger for interneurons than for afferent fibers. Convergence of various types of tactile and nociceptive inflow both from the same field and from different, often widely separated areas was demonstrated. The discharge patterns, analyzed by means of a counting rate meter, showed characteristic features for various modalities of skin sensation, excitatory as well as inhibitory responses being determined mainly by the peripheral receptor discharges. (Author)

AD-631 879 Fld. 6/16
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
THALAMIC RETICULAR SYSTEM AND CORTICAL AROUSAL,
by J. D. Schlag, F. Chaillet, and J. P. Herzet. 7 Aug 61, 2p. Contract AF 61 (052)-22,
Unclassified report

Availability: Published in Science v134 n3491 p1691-2 Nov 24 1961. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Electrophysiology), (*Thalamus, Electrophysiology), Electroencephalography, Stimulation, Cats, Belgium

By electrocoagulation of the thalamic posterior commissure, the electroencephalographic arousal by high frequency stimulation of the thalamic unspecific nuclei was prevented, whereas the synchronizing influence on the cerebral cortex remained intact. On this ground, the role of the 'thalamic reticular system' in the control of the cerebral rhythms is discussed. (Author)

AD-631 881 Fld. 6/16, 6/15
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
DETERMINAZIONE DELLA SOGLIA DELLE RISPOSTE ROTATORIE CEREBELLARI DAL FLOCCULO-NODULO DEL GATTO CURARIZZATO (DETERMINATION OF THE THRESHOLD OF THE CEREBELLAR ROTARY RESPONSE IN THE FLOCCULUS NODULE OF THE CURARIZED CAT),
by Torquato Gualtierotti, and Dino Passerini. 2 Aug 58, 4p. Contract AF 61 (052)-23, AFOSR TN-59-654
Unclassified report

Text in Italian.

Availability: Published in Rendiconti dell'Accademia Nazionale dei Lincei series 8 v26 n1 p79-82 Jan 1959. Copies to DDC users only.

Descriptors: (*Acceleration tolerance, Brain) Thresholds (Physiology), Cerebellum, Cerebral cortex, Electrophysiology, Curare alkaloids, Anesthesia, Cats, Italy

AD-631 882 Fld. 6/16
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
REGOLAZIONE DEL RITMO DI SCARICA DEL MOTONEURONE SPINALE PER MEZZO DELL'INIBIZIONE ANTIDROMICA DI RENSHAW (REGULATION OF THE RHYTHM OF DISCHARGE OF SPINAL MOTOR NEURONS BY MEANS OF THE ANTIDROMIC INHIBITION OF RENSHAW),
by Torquato Gualtierotti, Domenico Spinelli, and Anna Fiorentini. 10 Jun 58, 5p. Contract AF 61 (052)-23, AFOSR TN-59-376
Unclassified report

Text in Italian.

Availability: Published in Rendiconti dell'Accademia Nazionale dei Lincei series 8 v24 n6 p744-8 Jun 1958. Copies to DDC users only.

Descriptors: (*Nerve impulses, Rhythm (Biology)), Spinal column, Nerve cells, Neuromuscular transmission, Inhibition, Muscles, Central nervous system, Electrophysiology, Italy

AD-631 883 Fld. 6/16
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
RISPOSTE ROTATORIE E POSTROTATORIE CEREBELLARI E NISTAGMO NUCALE DEL PICCIONE (ROTARY AND POST-ROTARY CEREBELLAR RESPONSE AND NYSTAGMUS OF THE NAPE OF THE NECK IN THE PIGEON),
by Torquato Gualtierotti, and Dino Passerini. 2 Aug 58, 5p. Contract AF 61 (052)-23, AFOSR TN-59-377
Unclassified report

Text in Italian.

Availability: Published in Rendiconti dell'Accademia Nazionale dei Lincei series 8 v25 n3-4 p219-23 Sep-Oct 1958. Copies to DDC users only.

Descriptors: (*Acceleration tolerance, Pigeons), Nystagmus, Rotation, Head, Cerebellum, Cerebral cortex, Italy

AD-631 884 Fld. 6/16
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
SOGLIA CEREBELLARE ALLE ACCELERAZIONI ROTATORIE E SOMMAZIONE TEMPORALE NEL PICCIONE VIAGGIATORE (CEREBELLAR THRESHOLD OF ROTARY ACCELERATION AND TEMPORAL SUMMATION IN THE CARRIER PIGEON),
by Torquato Gualtierotti, and Dino Passerini. 2 Aug 58, 4p. Contract AF 61 (052)-23, AFOSR TN-59-378
Unclassified report

Text in Italian.

Availability: Published in Rendiconti dell'Accademia Nazionale dei Lincei series 8 v25 n1-2 p115-8 Jul-Aug 1958. Copies to DDC users only.

Descriptors: (*Acceleration tolerance, Pigeons), Cerebellum, Thresholds (Physiology), Rotation, Italy

AD-631 885 Fld. 6/16, 6/1
LONDON UNIV (ENGLAND)
THE EFFECTS OF CHLORINE AND OTHER FACTORS ON THE RELEASE OF ACETYLCHOLINE FROM THE STIMULATED PERFUSED SUPERIOR CERVICAL GANGLION OF THE CAT,
by E. K. Matthews. 18 Apr 63, 7p. Contract AF 61 (052)-25,
Unclassified report

Availability: Published in British Journal of Pharmacology and Chemotherapy v21 n2 p244-9 Oct 1963. Copies to DDC users only.

Descriptors: (*Ganglia, Stimulation), (*Acetylcholine, Secretion), Cats, Chlorine, Cholines, Electrolytes (Physiology), Physostigmine, Great Britain

When the superior cervical ganglion of the cat was perfused with Locke solution, the amount of acetylcholine released into the perfusate decreased during successive periods of repetitive stimulation of the preganglionic nerve. Addition of choline to the perfusion fluid prevented this decrease. Choline also significantly increased ($P<0.01$) the initial output of acetylcholine. In contrast, variation of the physostigmine concentration or of the pCHO2 and pH of the perfusion fluid had no statistically significant effect ($P>0.05$) upon the initial release of acetylcholine. (Author)

AD-631 887 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
MAY A SINGLE STIMULUS EVOKE TWO SENSATIONS SEPARATE IN SPACE,
by Lucia Ronchi. 1961, 5p. Contract AF 61 (052)-80, AFOSR 1261
Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n1 p77-80 Jan-Feb 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Stimulation), (*Stimulation, Sensation (Physiology)), Probability, Vision, Retina, Italy

There are some experimental conditions where there is a certain likelihood that two contemporaneous and distinct patterns are perceived, in spite of the fact that the retina is stimulated by a single flash. An explanation of such an apparently paradoxical effect is difficult to be drawn, partly because of the limited number of experimental data up to day collected. The attempt is made of inserting the reported effect in the frame of the retinal organization on the basis of some recent findings. (Author)

AD-631 888 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
NOTE ON THE EFFICIENCY OF TRIANGULAR LIGHT PULSES,
by Marcella Bittini. 1961, 3p. Contract AF 61 (052)-80, AFOSR 1259
Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n1 p47-8 Jan-Feb 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Light pulses), (*Light pulses, Geometric forms), Probability, Background, Illumination, Stimulation, Italy

It was found that, for green light, the effectiveness of a triangular stimulus differs with respect to that of a square stimulus of equal physical energy and equal duration, at luminances where the transition from rod to cone dominance occurs.

AD-631 889 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE COURSE OF PERCEIVED SHAPE AT TWILIGHT LUMINANCES. II. BLUE, RED, GREEN SPOTS IN EXTRAFOVEAL VISION,
by Lucia Ronchi. 1961, 8p. Contract AF 61 (052)-80,
AFOSR 2019

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n4 p388-94 Jul-Aug 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Geometric forms), (*Color vision, Low-intensity illumination), Colors, Illusions, Background, Italy

The threshold of perception relative to a small circular patch viewed, in extrafoveal vision, for a brief time, upon a background of mesopic luminance, implies the transition from the perception of the circular patch as such to a vague light sensation; the intermediate patterns consist of a small point (as if the circle would be concentrated in its center), or of a thin streak, or of an irregular figure with fuzzy contours. Sometimes the said figures are seen to move across the background, and often they are seen as decentered, in spite of the fact that they are actually steady and projected just in the center of the background. Last, the stimulus sometimes appears as consisting of two patterns well separated in space, in spite of the singleness of the physical stimulation. The above reported effects do not differ substantially when the spectral composition of light is changed from red to blue. As differences of higher order, we might emphasize that the frequency of occurrence of the (illusory motion) for green light is slightly greater than for the other two colors (steadiest patterns are seen under blue stimulation); in addition, the percent number of double responses is slightly greater for blue than for green, while red stimulation is in an intermediate position. (Author)

AD-631 890 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE DICOTOMY OF THE VISUAL SYSTEM,
by Lucia Ronchi, and Franco Mori. 1961, 9p. Contract AF 61 (052)-80,
AFOSR 1260

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n1 p69-76 Jan-Feb 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Adaptation (Physiology)), Psychophysiology, Vision, Probability, Thresholds (Physiology), Luminescence, Italy

The dichotomy of the visual system is represented by the aid of a schematic two-channels model. When the responses given by various subjects have to be compared, care must be taken to ascertain that the responses are all recorded from the same channel, in spite of the differences in gain at the various outputs. Some practical examples are adduced and discussed. (Author)

AD-631 891 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE FLUCTUATION OF VISUAL RESOLUTION,
by Mario Conticelli. 1961, 6p. Contract AF 61 (052)-80,
AFOSR 2016

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n3 p257-61 May-Jun 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Luminescence), Adaptation (Physiology), Vision, Target discrimination, Visual acuity, Thresholds (Physiology), Psychophysiology, Italy

A figure viewed under a small viewing angle is seen to fluctuate in shape under poor illumination. The number of fluctuations per minute is found to decrease with increasing luminance, if fixation is not obliged. When fixation is obliged, in a slightly extrafoveal point, fluctuation seems to be independent from the luminance level, in the range considered by the author. In addition, by the aid of a suitable effort, the observer is able to exert a sort of control on the peripheral factors responsible for fluctuation, so as to reduce its amount. (Author)

AD-631 892 Fld. 6/16, 6/15
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE INFLUENCE OF HOMATROPINE ON THE ADAPTATIONAL PROCESSES OF THE PERIPHERAL RETINA,
by Anna Maria Ercoles. 1961, 3p. Contract AF 61 (052)-80,
AFOSR 1258

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n2 p130-1 Mar-Apr 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Adaptation (Physiology)), (*Tropane alkaloids, Visual perception), Retina, Vision, Italy

AD-631 893 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE INFLUENCE OF SPECTRAL COMPOSITION OF THE STIMULUS ON THE ELECTRORETINOGRAPHIC INTENSITY FUNCTION,
by Anna Maria Ercoles. 1961, 12p. Contract AF 61 (052)-80,
AFOSR 2017

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n3 p262-72 May-Jun 1961. Copies to DDC users only.

Descriptors: (*Spectra (Visible + ultraviolet), Electroretinography), (*Electroretinography, Intensity), Light, Stimulation, Adaptation (Physiology), Vision, Retina, Colors, Psychophysiology, Italy

The spectral composition of the light is known to affect the slope of the electroretinographic intensity function recorded by stimulating a dark-adapted eye with a series of single flashes. The slope of the minus red function is found to be intermediate between the slope of the green function and that of the blue function, respectively. The minus green curve - shows some unexpected irregularities in the neighborhood of the 200 microvolts response. The minus blue function shows a regular linear behavior. (Author)

AD-631 894 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE SIZE OF THE HUMAN ERG AFTER BLOOD DONATION 'ONE CASE REPORT',
by G. Abbozzo. 1961, 3p. Contract AF 61 (052)-80,

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n1 p51-2 Jan-Feb 1961. Copies to DDC users only.

Descriptors: (*Electroretinography, Blood volume), Blood circulation, Retina, Italy

AD-631 895 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
PERIPHERAL DIFFERENTIAL THRESHOLD UNDER PROLONGED FIXATION,
by Anna Maria Ercoles. 1961, 4p. Contract AF 61 (052)-80,
AFOSR 2900

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n5 p477-9 Sep-Oct 1961. Copies to DDC users only.

Descriptors: (*Visual perception, Adaptation (Physiology)), Vision, Thresholds (Physiology), Luminescence, Brightness, Probability, Italy

AD-631 897 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
SPEED OF READING AND DIFFERENTIAL BINOCULAR ADAPTATION, I. PERLIMINARY REPORT,
by Mario Conticelli. 1961, 8p. Contract AF 61 (052)-80,
AFOSR 2018

Unclassified report

Availability: Published in Atti Della Fondazione Girogio Ronchi v16 n4 p381-7 Jul-Aug 1961. Copies to DDC users only.

Descriptors: (*Reading, Adaptation (Physiology)), Thresholds (Physiology), Vision, Eye, Visual perception, Luminescence, Velocity, Italy

The speed of reading a test above the threshold of visibility, in monocular vision, is found to be influenced by the state of adaptation of the other eye. Such an effect is tested for luminances of the target falling in the range where a decrease in luminance corresponds to a decrease in the speed of reading. The individual differences are correlated with eye dominance and discussed. (Author)

AD-631 898 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
SPEED OF READING UNDER RED AND WHITE ILLUMINATIONS,
by Mario Conticelli. 1961, 8p. Contract AF 61 (052)-80,
AFOSR 2899

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n5 p509-17 Sep-Oct 1961. Copies to DDC users only.

Descriptors: (*Reading, Colors), (*Visual perception, Colors), Illumination, Vision, Fatigue (Physiology), Eye, Adaptation (Physiology), Performance (Human), Velocity, Italy

A cardboard where some rows of figures are type -written is presented in monocular vision at a suitable viewing distance, and the speed of reading is determined. If the subject is dark-adapted and performs, say, ten readings, each one lasting about 30 sec, and intervalled from one another by dark periods of 30 sec, the behavior of the speed of reading shows a sort of rhythm, which corresponds to a subjective impression of greater of lesser weariness. Such a rhythm is found to differ under red illumination with respect to white illumination, and, in addition noticeable troubles are tested when light -adapting the eye as described in the test. (Author)

AD-631 899 Fld. 6/16, 5/10
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
TRAINING AND ELECTRORETINOGRAPHIC RESPONSES,
by Lucia Ronchi, and Anna Maria Ercoles. 1961, 15p. Contract AF 61 (052)-80, AFOSR 2901

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v16 n5 p518-31 Sep-Oct 1961. Copies to DDC users only.

Descriptors: (*Electroretionography, Training), Retina, Adaptation (Physiology), Stimulation, Response, Performance (Human), Psychophysiology, Italy

A number of records are reported which seem to show a paradoxical influence of 'expectation' on the electroretinographic responses. In particular, the initial records obtained from an untrained subject show a negative feature which tends to disappear during the various successive experimental sets, while the size of the positive feature tends to increase. It is tentatively suggested that the above reported changes correspond to the release, during incoming training, of central suppression which is known to counteract the stimulation produced by intraocular scatter. (Author)

AD-631 900 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
SENSORY RESPONSES OF THE AMYGDALA WITH SPECIAL REFERENCE TO SOMATIC AFFERENT PATHWAYS,
by R. Wendt, and D. Albe-Fessard. 1961, 38p. Contract AF 61 (052)-103,

Unclassified report

Availability: Published in Physiologie de l'Hippocampe p171-200 1961. Copies to DDC users only.

Descriptors: (*Sensory perception, Electrophysiology), (*Brain, Sensory perception), Visual perception, Auditory perception, Stimulation, Anesthesia, Barbiturates, Nervous system, Physiology, Cats, France

Sensory responses of the amygdala and prepiriform cortex were studied with macroelectrode and microelectrode recording in the cat anesthetized with chloralose. The presence of evoked responses to somatic, visual and auditory stimuli, previously reported by others under different conditions, has been confirmed. Responses to these three modalities have a similar waveform and occur in the same area of the amygdala and prepiriform cortex, but with different spatial extent. The lateral and basal nuclei of the amygdala and the prepiriform cortex showed responses to the most extensive regions of the body surface as well as to visual and auditory stimulation. Evoked responses in the amygdala and prepiriform cortex to electrical stimulation of the skin and subcutaneous structures are bilateral, do not show somatotopic organization and occur at a relatively brief latency (15-17 msec for anterior contralateral limb). Responses in the lateral amygdaloid nucleus to somatic, visual and auditory stimulation were also recorded in the unanesthetized freely moving cat. Barbiturate anesthesia greatly reduced responses to somatic stimulation. The central pathways which mediate the responses of the amygdala to somatic stimulation have been studied by direct central stimulation and by a technique which permitted localized reversible cold block of thalamic and cortical regions. (Author)

AD-631 901 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
ON THE INTEGRATIVE PROPERTIES OF THE DARK ADAPTED RETINA: ELECTRORETINOGRAPHIC INVESTIGATION,
by Lucia Ronchi, and Marcella Bittini. 1957, 11p. Contract AF 61 (514)-634,

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v12 n5 p477-85 Sep-Oct 1957. Copies to DDC users only.

Descriptors: (*Retina, Adaptation (Physiology)), Electroretinography, Colors, Response, Stimulation, Luminescence, Vision, Italy

When blue-violet stimuli are used, at mean luminance levels, the dark adapted retina is found to be able to integrate all the energy received within the latency time of the b-wave, independently of the distribution of the luminance as a function of time. For white (or green) stimuli, this property does not hold: the efficiency of a given amount of energy is greater, the greater is the time of variation of the luminance within the stimulus. (Author)

AD-631 902 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
THE RELATION BETWEEN PUPIL EFFICIENCIES FOR SMALL AND EXTENDED PUPILS OF ENTRY,
by Anna Maria Ercoles, Lucia Ronchi, and G. Toraldodi Francia. 8 Mar 56, 7p. Contract AF 61 (514)-634,

Unclassified report

Availability: Published in Optica Acta v3 n2 p84-9 Jun 1956. Copies to DDC users only.

Descriptors: (*Eye, Illumination), Retina, Brightness, Italy

Photometric matching fields were illuminated by the method of Maxwellian view. Pupil efficiencies were determined for effective pupils of entry (focussed images in the pupil plane) as follows: a single 'pinhole,' two pin-holes placed either symmetrically or asymmetrically with respect to the pupil centre, full circles and rings centred in the pupil, and semi-circles. The main object was to find if the observed pupil efficiency for the extended pupil of entry patterns could be derived from the observed pupil efficiencies of the parts by applying the additive law. The three observers showed different behaviour but in no case was the derived efficiency for an extended pupil of entry pattern greater than the directly observed efficiency (over-additivity). On the other hand, under-additivity does occur. A tentative theoretical explanation of under-additivity is suggested in terms of inhibition and of possible differences of inclination of the axes of the foveal cones. But it is conceivable that a component of inhibition may depend on the colour-differences which accompany the Stiles-Crawford effect (Proc. Roy. Soc. B112:428 (1933)).

AD-631 909 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
EFFETTI CENTRIFUGHI RETINICI INDOTTI DALLA STIMOLAZIONE CHIMICA DEI LOBI OTTICI (CENTRIFUGAL EFFECT OF THE RETINA INDUCED BY THE CHEMICAL STIMULATION OF THE OPTICAL LOBE),
by A. Borrazzo, and A. Mollica. 1958, 2p. Contract AF 61 (514)-1125, AFOSR TN-59-827

Unclassified report

Text in Italian.

Availability: Published in Dal Bollettino Della Societa Italiana di Biologia Sperimentale v34 p23-4 1958. Copies to DDC users only.

Descriptors: (*Brain, Stimulation), (*Retina, Stimulation), Electroretinography, Pigeons, Chemistry, Italy

AD-631 910 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ELETTROENCEFALOGRAMMA E COMPORTAMENTO DOPO LESIONI CRONICHE DELLA SOSTANZA RETICOLARE E DELLE VIE DELLA SENSIBILITA SPECIFICA (THE ELECTROENCEPHALOGRAM AND BEHAVIOR AFTER CHRONIC INJURY TO THE RETICULAR SUBSTANCE AND SPECIFIC SENSORIMOTOR TRACTS).
by G. F. Rossi. 1957, 22p. Contract AF 61 (514)-1125, AFOSR TN-59-386

Unclassified report

Text in Italian.

Availability: Published in Atti del Convegno di Parma p131-51 Nov 23-24 1957. Copies to DDC users only.

Descriptors: (*Brain, Wounds and injuries), Behavior, Electroencephalography, Nervous system, Electrophysiology, Cats, Italy

AD-631 911 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
INFLUENZE SINCRONIZZANTI L'ELETTROENCEFALOGRAMMA E LORO ORIGINE NELLE PARTI CAUDALI DEL TRONCO DELL'ENCEFALO (INFLUENCES SYNCHRONIZING THE ELECTROENCEPHALOGRAM AND THEIR ORIGINS IN THE CAUDAL PART OF THE BRAIN STEM),
by J. P. Cordeau, and M. Mancia. 1958, 4p. Contract AF 61 (514)-1125, AFOSR TN-59-832

Unclassified report

Text in Italian.

Availability: Published in Rivista di Neurologia v29 n2 p132-4 Mar-Apr 1959. Copies to DDC users only.

Descriptors: (*Brain, *Electroencephalography), Italy

AD-631 912 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
MODIFICAZIONI ELETTROENCEFALOGRAFICHE PER EMILESIONI CHRONICHE DEL MESENCEFALO NEL GATTO (ELECTROENCEPHALOGRAPHIC MODIFICATION THROUGH CHRONIC UNILATERAL LESIONSKOF THE MIDBRAIN OF THE CAT),
by J. P. Cordeau, and M. Mancia. 1958, 2p. Contract AF 61 (514)-1125, AFOSR TN-59-829

Unclassified report

Text in Italian.

Availability: Published in Dal Bollettino della Societa Italiana di Biologia Sperimentale v34 n23-4 p1690-1 1958. Copies to DDC users only.

Descriptors: (*Electroencephalography, Brain), Cats, Italy

AD-631 913 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
PROVE SPERIMENTALI IN FAVORE DELL'ESISTENZA DI STRUTTURE SINCRONIZZANTI L'ELETTROENCEFALOGRAMMA NELLE PARTI CAUDALI DEL TRONCO DELL'ENCEFALO (EXPERIMENTAL PROOF IN FAVOR OF THE EXISTENCE OF THE STRUCTURE SYNCHRONIZING THE ELECTROENCEPHALOGRAM IN THE CAUDAL PART OF THE BRAIN STEM),

by J. P. Cordeau, and M. Mancia. 1958, 2p. Contract AF 61 (514)-1125,
AFOSR TN-59-830

Unclassified report

Text in Italian.

Availability: Published in Dal Bollettino della Societa di Biologia Sperimentale v34 n23-4 p1691-2 1958. Copies to DDC users only.

Descriptors: (*Brain, *Electroencephalography), Italy

AD-631 914 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
RECENTI CONTRIBUTI ALLA FISIOLOGIA DEL SONNO (RECENT CONTRIBUTIONS TO THE PHYSIOLOGY OF SLEEP),
by G. Moruzzi, G. F. Rossi, and A. Zanchetti. 1957, 14p. Contract AF 61 (514)-1125,
AFOSR TN-59-387

Unclassified report

Text in Italian.

Availability: Published in Atti della Societa Lombarda di Scienze Medico-Biologiche v13 supl. n35 p1-12 1958. Copies to DDC users only.

Descriptors: (*Sleep, Physiology), Italy, Electroencephalography

AD-631 915 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
RICERCHE SULL'ORIGINE DELLA PERSISTENTE SINDROME DI VEGLIA DEL PREPARATO MEDIOPONTINO. DATI A FAVORE DELL'ESISTENZA DI UNA INFLUENZA SINCRONIZZANTE DI STRUTTURE BULBO-PONTINE SULL'ATTIVITA ELETTRICA CEREBRALE (RESEARCH ON THE PERSISTENT SYNDROME OF WAKEFULNESS OF THE MIDPONTINE PREPARATION. DATA IN FAVOR OF THE EXISTENCE OF A SYNCHRONIZING INFLUENCE OF THE BULBO-PONTINE STRUCTURE ON THE ELECTRICALLY ACTUATED BRAIN),
by C. Batini, F. Magni, M. Palestini, G. F. Rossi, and A. Zanchetti. 1959, 4p. Contract AF 61 (514)-1125,

Unclassified report

Text in Italian.

Availability: Published in Rivista di Neurologia v29 n2 p126-9 Mar-Apr 1959. Copies to DDC users only.

Descriptors: (*Brain, Electrophysiology), Attention, Electroencephalography, Nervous system, Physiology, Cats, Italy

AD-631 916 Fld. 6/16, 6/1, 5/10
OSLO UNIV (NORWAY) NEUROPHYSIOLOGICAL LAB
INCREASE OF PLASMA 17-HYDROXYCORTICOSTEROIDS BY CEREBRAL CORTICAL AND AMYGDALOID STIMULATION IN THE CAT,
by J. Setekleiv, O. E. Skaug, and B. R. Kaada. 3 Oct 60, 9p. Contract AF 61 (514)-1127,
AFOSR 2030

Unclassified report

Prepared in cooperation with Lier Mental Hospital, Norway, Research Lab.

Availability: Published in J. Endocrin. v22 p119-27 1961. Copies to DDC users only.

Descriptors: (*Brain, Stimulation), (*Corticosteroid agents, *Blood plasma), Cerebellum, Cerebral cortex, Hormones, Secretion, Behavior, Fear, Cats, Norway

Behavioural arousal and fear may be induced by electrical stimulation of the cingulate and the temporo-occipital cortex and the amygdala in the cat. The influence of these regions on the plasma level of 17-hydroxycorticosteroids (17-OHCS) was studied. To eliminate the possibility that any increase observed was not secondary to arousal or fear caused by environmental factors or the blood sampling, the experiments were carried out under anaesthesia. Increase of the plasma level of the 17-OHCS was produced by stimulation of twenty-five points in the following three regions: (a) the anterior cingulate cortex; (b) the lower portion of the psterior ecto- and suprasylvian gyri of the temporo-occipital cortex, and (c) the amygdala. The increase amounted up to 560% of the control values. The response was obtained during light anaesthesia only. Stimulation of thirty-seven points in other cortical regions and in the internal capsule caused no significant change in the plasma steroid level. (Author)

AD-631 917 Fld. 6/16, 5/10
CFSTI Prices: HC $1.60 MF $0.50
OSLO UNIV (NORWAY) NEUROPHYSIOLOGICAL LAB
RESEARCH ON FUNCTIONAL SIGNIFICANCE OF 'LIMBIC' AND RELATED STRUCTURES IN THE BRAIN.
Final technical rept. 1 Feb 61-31 Jan 62,
by Birger Kaada. 31 Jan 62, 16p. Contract AF 61 (514)-1127,

Unclassified report

Document includes summary of entire research work done under this contract.

Descriptors: (*Brain, Physiology), (*Behavior, Brain), Learning, Rats, Anatomy, Memory, Attention, Emotions, Electrophysiology, Sex, Stimulation, Norway, Psychophysiology

Studies on the following topics were made: (1) telencephalic (cortical and amygdaloid) attention or arousal mechanism and emotion, (2) rats with lesions in limbic and related structures, and (3) electrophysiology of the hippocampus.

AD-631 921 Fld. 6/16, 6/12
CFSTI Prices: HC $1.60 MF $0.50
GOETTINGEN UNIV (WEST GERMANY) PHYSIOLOGICAL INST
EFFECT OF AUTONOMIC AFFERENT IMPULSES ON BRAINSTEM NEURONS.
Final rept.,
by Kurt Kramer. 19 Sep 57, 18p. Contract AF 61 (514)-1265,

Unclassified report

Descriptors: (*Nerve cells, Nerve impulses), (*Brain, *Nerve impulses), Autonomic nervous system, Thalamus, Histology, Electrodes, Miniature electrical equipment, Electrical insulation, Quartz, Electroencephalography, West Germany

To take recordings of action potentials of single units in the nucleus supra opticus the following preparatory studies were carried out. (1) Histological studies of the basal hypothalamic area revealed basal position and disk shaped form of the nucleus, its high vascularisation and dense population of fairly large cells. (2) Several types of microelectrodes were tested. A modification of Hubels tungsten wire, electrolytically sharpened, was found to be the electrode most suitable for the purpose. Insulation of electrode was obtained by quarz evaporation. (3) The subcortical approach to the nucl.sup.opt. made necessary a modification of the classical stereotactic device. (4) Examples of microelectrode recordings in the nucl.sup.opt. are shown. Local discharge patterns show pulsatory rhythms sometimes closely related to heart rate. In other cases rhythms are independent but under vagal control. (Author)

AD-631 923 Fld. 6/16
WILLIAM G KERCKHOFF-HERZFORSCHUNGS- INSTITUT DER MAX-PLANCK-GESELLSCHAFT Z F D W BAD NAUHEIM (WEST GERMANY)
VOLUME CONDITIONED STIMULI AFFECTING SALT AND WATER EXCRETION.
Final technical rept. 1 Apr 58-30 Sep 62,
by Otto H. Gauer. 30 Sep 62, 130p. Contract AF 61 (052)-31,

Unclassified report

Availability: Published in Various reprints. Copies to DDC users only.

Descriptors: (*Excretion, *Body fluids), Salts, Water, Electrolytes (Physiology), Volume, Stimulation, Dogs, Kidneys, Blood circulation, Hypoxia, Veins, West Germany

The report contains the following reprints. (1) Pabst, K. und O. H. Gauer: Volumenreflektorische Anderung der Natriumausscheidung beim Hund. Verh. Dtsch. Ges. Kreisl.-forsch. 25 263 (1959); (2) Pabst, K.: Die Ausscheidungsfunktion der Niere nach schneller Infusion kochsalzhaltiger und kochsalzfreier Losung. Pflugers Arch. Physiol. 273 315 (1961); (3) Witte, E., H. Reineck und O. H. Gauer: Antidiurese und Diurese nach kleinen Tonephingaben bei der Ratte, abhangig vom oralen NaCl-Angebot. Pflugers Arch. Physiol. 274 262 (1961); (4) Pabst, K. und O. H. Gauer: Nierenhamodynamik und Ausscheidungsfunktion der Niere unter definierten Anderungen des Blutvolumens. Pflugers Arch. Physiol. 274 213 (1961); (5) Thron, H. L. und A. Hintze: Der zentrale Venendruck des Menschen bei akuter arterieller Hypoxie. Pflugers Arch. Physiol. 274 252 (1961); (6) Hintze, A. und H. L. Thron: Das Verhalten der menschlichen Handvenen bei akuter arterieller Hypoxie. Pflugers Arch. Physiol. 274 227 (1961); (7) Somlyay, L., H. L. Thron, K. Petran und G. Carl: Die Nierenfunktion wahrend doppelseitiger Carotisabklemmung am wachen Hund. Pflugers Arch. Physiol. 276 117 (1962); (8) Gauer, O. H. and H. L. Thron: Properties of veins in vivo: Integrated effects of their smooth muscle. Physiol. Rev. 42 Supplement 5 283 (1962).

AD-631 932 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
THE MIDPONTINE PRETRIGEMINAL CAT,
by Giuseppe Moruzzi. 27 Jan 62, 8p. Contract AF 61 (514)-1125,

Unclassified report

Availability: Published in Archives Internationales de Pharmacodynamie et de Therapie v140 n1-2 p227-30 1962. Copies to DDC users only.

Descriptors: (*Brain, Sleep), (*Sleep, Electroencephalography), Behavior, Conditioned reflex, Eye, Stimulation, Electrophysiology, Cranial nerves, Surgical techniques, Nervous system, Physiology, Cats, Reviews, Italy

Some of the results obtained in the Institute of Physiology of the University of Pisa on the midpontine pretrigeminal preparation are reviewed in this article. Particular attention is given to recent experiments by Affanni, Marchiafava and Zernicki, which show that both orienting reflex and conditioning may be present in the midpontine pretrigeminal cat.

AD-631 981 Fld. 6/16, 5/10
NAVAL MEDICAL RESEARCH LAB NEW LONDON CONN
RELATIVE RED-GREEN SENSITIVITY AS A FUNCTION OF RETINAL POSITION,
by Mary M. Connors, and Jo Ann S. Kinney. 29 May 61, 6p. Rept. no. 377,
NAVMED MR005.14-1001-1.27

Unclassified report

Availability: Published in Journal of the Optical Society of America v52 n1 p81-4 Jan 1962. Copies to DDC users only.

Descriptors: (*Color vision, Sensitivity), Colors, Retina, Signals, Ships, Signal lights

Hue cancellation was employed to obtain sensitivity curves for red and for green by the method of constant stimuli. Data were taken at the fovea, and at points every 2 deg along the lower vertical meridian of the visual field. The results show that sensitivity to red, relative to green, is highest at the fovea, and decreases as the peripheral angle is increased. The relative sensitivity to green is highest in the near periphery, from 2 to 10 deg from the fovea. Beyond this point it falls rapidly, and is no longer measurable at positions where red responses are still obtained. (Author)

AD-632 026 Fld. 6/16
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
BINOCULAR INTERACTION EFFECT II: INVESTIGATION ON THE TIME BEHAVIOR OF MONOCULAR SENSITIVITY DURING CONTRALATERAL STIMULATION,
by Adriana Fiorentini, and Marcella Bittini. 1962, 17p. Contract AF 61 (052)-80, AFOSR 4172

Unclassified report

Availability: Published in Atti Della Fondazione Giorgio Ronchi v17 n3 p286-301 May-Jun 1962. Copies to DDC users only.

Descriptors: (*Vision, Adaptation (Physiology)), (*Eye, Sensitivity), Time, Stimulation, Illumination, Brightness, Retina, Italy

Illumination of one eye has two effects on sensitivity in a disparate area of the visual field of the other eye, namely depresses apparent brightness and impairs sensitivity to time increments of luminance. The time courses of both monocular brightness sensitivity and increment sensitivity were investigated in an interval of time including the onset of illumination of the disparate area of the other eye. A comparison is made with the time course of monocular sensitivity during an interval of time including stimulation of a different area of the same eye. In the case of contralateral stimulation, the apparent brightness of a steadily illuminated monocular field is found to decrease by a smaller amount and with a longer delay than in the case of unilateral stimulation. The comparison between the time course of increment monocular sensitivity during contralateral stimulation and the time course of monocular sensitivity during unilateral stimulation shows that, even in the latter case, the changes in differential sensitivity induced by presentation of a conditioning field are partly attributable to nonperipheral inhibitory mechanisms. (Author)

AD-632 073 Fld. 6/16
COPENHAGEN UNIV (DENMARK) INST OF NEUROPHYSIOLOGY
SOME FINDINGS ON CENTRAL NERVOUS SYSTEM ORGANIZATION WITH RESPECT TO COLOR,
by Margaret A. Lennox-Buchthal. 1960, 9p. Contract AF 61 (052)-189, AFOSR 714

Unclassified report

Availability: Published in The Visual System: Neurophysiology and Psychophysics p191-7 1960. Copies to DDC users only.

Descriptors: (*Color vision, *Central nervous system), Retina, Neurology, Colors, Visual perception, Photoreceptors, Optic nerve, Denmark, Light, Vision, Cats, Humans, Monkeys

Evidence is reviewed that reorganization of visual messages with respect to color occurs in the central nervous system. In man, cat-fish and cat blue and red stimuli of equal brightness appear to undergo temporal differentiation in that red stimuli are transmitted more rapidly than blue. This has not so far been confirmed for monkey. In monkey cortex (the eye light adapted) more than half the single units responding to light did so with narrow spectral responsiveness. Different units responded to flashes through only one of four broad pass filters peaked at 450, 515, 587 or > 600 millimicrons. All single units with narrow spectral responsiveness to 560 millimicrons responded as well to one or two adjacent filters. The response of the same cells to optic nerve stimulation suggested that they lay on a one to one pathway from optic nerve to cortex. The different experimental conditions from those used in studies of monkey geniculate do not appear sufficient to explain the difference in results. It seems likely that the information available to single cortical cells is different from that at geniculate and that it is simpler. (Author)

AD-632 086 Fld. 6/16
CFSTI Prices: HC $2.60 MF $0.50
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
BASIC RESEARCH IN THE FIELD OF VISION,
by Lucia Ronchi, and Anna M. Ercoles. 1961, 29p. Contract AF 61 (052)-80, AFOSR 1256 ,AFOSR 1257

Unclassified report

Descriptors: (*Vision, *Electroretinography), Light, Stimulation, Analysis of variance, Training, Italy

A number of cases are reported where the shape of the human ERG appears as distorted and its size either enhanced or depressed, independently from the physical characteristics of the light stimulus and from the adaptation state of the retina. The results are interpreted by suggesting that unusual factors such as training and expectation may affect the ERG response. (Author)

AD-632 089 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
MODIFICATION DES RESPONSES SENSORIELLES CORTICALES PAR STIMULATION DE L'HIPPOCAMPE DORSAL CHEZ LE LAPIN (MODIFICATION OF SENSORY CORTICAL RESPONSES BY STIMULATION OF THE RABBIT DORSAL HIPPOCAMPUS),
by P. Cazard, and P. Buser. 17 Aug 62, 13p. Contract AF 61 (052)-103,

Unclassified report

Text in French; Attached Summary in English.

Availability: Published in Electroencephalography and Clin cal Neurophysiology v15 p413-25 1963. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Stimulation), Brain, Sensory mechanisms, Rabbits, France

A short, repetitive, non-epileptogenic stimulation of the dorsal hippocampus elicits an increase in amplitude of sensory cortical responses to peripheral stimuli, especially of those recorded from the motor cortex. This effect develops progressively from the end of the hippocampal stimulation; it may last for up to several minutes. However, it is a labile phenomenon which sometimes fails to appear; hippocampal tetanization is then only followed by a depression. In unanesthetized preparations (curarized or free), hippocampal stimulation also elicits large amplitude, slow electrocortical rhythms. However, no close correlation was noticed between these electrocortical changes and the amplification of the evoked potentials. In free implanted animals, hippocampal stimulation produces moreover an 'attentive' or 'searching' behaviour. In free animals also, repeated associations of peripheral and hippocampal stimulations have led to 'long term' facilitatory effects on sensory evoked potentials. (Author)

AD-632 095 Fld. 6/16, 6/15
LUND UNIV (SWEDEN) DEPT OF PHARMACOLOGY
NERVOUS CONTROL OF CHEMOSENSITIVITY IN MUSCLE,
by S. Thesleff. 1961, 12p. Contract AF 61 (052)-106,PHS-B-2646

Unclassified report

Availability: Published in Annals of the New York Academy of Sciences v94 art2 p535-46 Sep 6 1961. Copies to DDC users only.

Descriptors: (*Muscles, Neuromuscular transmission), (*Chemoreceptors, Sensitivity), (*Nervous system, Control), (*Acetylcholine, Sensitivity), Nerves, Musculoskeletal system, Sweden

AD-632 096 Fld. 6/16
LUND UNIV (SWEDEN)
A STUDY OF SOME ELECTROPHYSIOLOGICAL PROPERTIES OF HUMAN INTERCOSTAL MUSCLE.
Technical note,
by D. Elmquist, T. B. Johns, and S. Thesleff. 12 Sep 60, 7p. Rept. no. TN-7, Contract AF 61 (052)-106, AFOSR 607

Unclassified report

Availability: Published in J. Physiol. v154 p602-7 1960. Copies to DDC users only.

Descriptors: (*Neuromuscular transmission, Humans), (*Muscles, *Electrophysiology), Electrical properties, Membranes (Biology), Resistance (Electrical), Mammals, Sweden

The spontaneous subthreshold activity at the myoneural junction was studied, and the membrane constants of the muscle fibres were determined. It was found that human intercostal muscles proved to be excellent preparations for studies in vitro. It was shown that the electrophysiological properties of these muscles are rather similar to those of other mammalian species, except that the frequency of the miniature end-plate potentials (m.e.p.p.) is considerably lower, and the membrane resistance higher. (Author)

AD-632 098 Fld. 6/16, 6/15
NOBEL INST FOR NEUROPHYSIOLOGY STOCKHOLM (SWEDEN)
SINGLE UNIT ACTIVITY IN THE RABBIT LATERAL GENICULATE BODY DURING EXPERIMENTAL EPILEPSY,
by U. Soderberg, and G. B. Arden. 1964, 10p. Contract AF 61 (052)-119, AFOSR 2908

Unclassified report

Availability: Published in Reprint. Copies to DDC users only.

Descriptors: (*Epilepsy, *Cerebral cortex), Nervous system, Physiology, Brain, Light, Stimulation, Retina, Hyperventilation, Drugs, Vision, Barbiturates, Nerve cells, Nerve impulses, Convulsive disorders, Electroencephalography, Rabbits, Sweden

The activity of single cells of the rabbit lateral geniculate body was studied and related to various states of wakefulness and to cortical seizures that developed spontaneously, after activation with flickering light, moderate hyperventilation or after the administration of bemegride. Bemegride increases the firing rate of geniculate cells both in the dark and when the retina is stimulated with flickering light. Bemegride counteracts the depressing effect of sodium pentobarbital. Even convulsive doses of bemegride have remarkably little influence on the lateral geniculate body. This is in agreement with previous findings with gross electrodes in Metrazol activated animals. In spontaneously occurring epilepsy in encephale isole animals with acute cortical lesions, and after photic activation in these animals, there is a long-lasting marked inhibition of geniculate activity. This inhibition does not prevent flickering light from influencing cortical activity. The findings are dis-

cussed in relation to previous investigations on the relation between specific and non-specific visual pathways. The geniculate inhibition in a seizure may bear a relation to the reported loss in man of visual sensations which therefore need not necessarily be of cortical origin. (Author)

AD-632 114 Fld. 6/16, 6/3
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
RISPOSTE ELETTRORETINOGRAFICHE ALLA LUCE POLARIZZATA NEL LICOSIDE ARCTOSA VARIANA C. L. KOCK (ELECTRO-RETINOGRAPHIC REACTIONS TO THE POLARIZED LIGHT IN THE LYCOSIDA ARCTOSA VARIANA C. L. KOCK),
by F. Magni, F. Papi, H. E. Savely, and P. Tongiorgi. 1962, 2p. Contract AF 61 (052)-107, AFOSR J-1172

Unclassified report

Availability: Published in Dal Bollettino della Societa' Italiana di Biologia Sperimentale v38 n24 p1706-7 1962. Copies to DDC users only.

Descriptors: (*Arachnids, Electroretinography), (*Electroretinography, Light), Polarization, Visual perception, Adaptation (Physiology), Vision, Italy

AD-632 115 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ENHANCEMENT OF CORTICAL RESPONSES TO SHOCKS DELIVERED TO LATERAL GENICULATE BODY. LOCALIZATION AND MECHANISM OF THE EFFECTS,
by A. Arduini, and M. H. Goldstein, Jr. 1962, 17p. Contract AF 61 (052)-107, AFOSR 2829

Unclassified report

Prepared in cooperation with Massachusetts Institute of Technology, Cambridge.

Availability: Published in Archives Italiennes Biologie v99 n4 p397-412 1961. Copies to DDC users only.

Descriptors: (*Vision, *Cerebral cortex), (*Retina, Adaptation (Physiology)), Brain, Light, Stimulation, Inhibition, Illumination, Nervous system, Physiology, Nerve impulses, Nerve cells, Electroencephalography, Italy

Retinal conditions (deafferentation and illumination) which produce an enhancement of the responses led from the visual cortex following single shocks applied to the lateral genicule body, do not significantly increase the responses of the auditory cortex to a medial geniculate volley. Thus, these effects are less generalized than the changes of EEG patterns which follow retinal deafferentation in the midpontine pretrigeminal preparation. Even within the visual system, no enhancement is observed when the stimulating electrode is in the anterior quartet of the lateral geniculate nucleus. If flickering light is used, at high rates of flicker (above 50/sec) results are the same as with steady illumination. As the flicker rate is decreased the amplitude of the shock evoked responses decreases until, at low rates of flicker, the responses are smaller than those obtained with the retinas dark-adapted. These findings support the hypothesis that enhancement effects obtained during steady retinal illumination or deafferentation result from a decrease in the neural traffic in the optic tracts. In control conditions (dark-adapted retinas) this neural traffic originates in the retinal dark discharge. A reduction or the complete temporary abolition of the retinal dark discharge may increase the shock evoked cortical response i) by releasing the geniculo -cortical system from a tonic inhibitory influence exerted by the dark discharge or ii) by reducing or abolishing the occlusion phenomena produced by the tonic activity. (Author)

AD-632 116 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ATTIVITA' TONICA DELLA RETINA REGISTRATA CON SEMIMICROELETTRODI (TONAL ACTIVITY OF THE RETINA REGISTERED BY SEMIMICROELECTRODES),
by A. Arduini, and A. Cavaggioni. 1961, 3p. Contract AF 61 (052)-107,

Unclassified report

Availability: Published in Dal Bollettino della Societa' Italiana di Biologia Sperimentale v37 n24 p1393-5 1961. Copies to DDC users only.

Descriptors: (*Retina, Electroretinography), (*Color vision, Measurement), Electrodes, Italy

AD-632 117 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ENHANCEMENT OF EEG SYNCHRONY IN THE ACUTE 'CERVEAU ISOLE',
by E. Bizzi, and W. A. Spencer. 1962, 15p. Contract AF 61 (052)-107, AFOSR 2885

Unclassified report

Availability: Published in Arch. Ital. Biol. v100 p234-47 1962. Copies to DDC users only.

Descriptors: (*Brain, Stimulation), Electroencephalography, Retina, Sensory mechanisms, Cats, Vision, Optic nerve, Smell, Italy

The effects of reversible functional visual deafferentation produced by retinal ischemia and irreversible olfactory deafferentation were studied in acute post-collicular cerveau isole preparations which showed interspindle lulls characterized by low voltage fast activity. Visual deafferentation was found to produce a generalized increase in cortical synchrony, but olfactory deafferentation failed to produce anything more than temporary changes in EEG pattern. The effects of retinal ischemia can be assigned to the withdrawal of tonic retinal impulses for the following reason: (a) the effects were not accompanied by any alterations in EKG or blood pressure, (b) the effects were duplicated by optic nerve ligation, (c) ocular compression following optic nerve ligation failed to produce any further change. These data suggest that the acute post-collicular cerveau isole possesses tonically active desynchronizing structures which are reflexly driven by impulses. Possible mechanisms underlying this activity are discussed, and their relationship to the activating potentialities of the chronic cerveau isole are suggested. (Author)

AD-632 118 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ACTIVITY OF SINGLE UNITS IN THE PRIMARY OPTIC CORTEX IN THE UNANAESTHETIZED RABBIT DURING VISUAL, ACOUSTIC, OLFACTORY AND PAINFUL STIMULATION,
by T. Lomo, and A. Mollica. 1962, 36p. Contract AF 61 (052)-107, AFOSR 2827

Unclassified report

Availability: Published in Arch. Ital. Biol. v100 p86-120 1962. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Stimulation), (*Sensory perception, Cerebral cortex), (*Electrophysiology, Sensory perception), Nervous system, Physiology, Visual perception, Auditory perception, Smell, Pain, Light, Sensation (Physiology), Barbiturates, Strychnos alkaloids, Nerve impulses, Behavior, Electroencephalography, Rabbits, Italy

The effects of natural stimuli, both specific (luminous), and non-specific (acoustic, olfactory and painful) on the discharge of single units of the primary optic cortex were studied. Of the units recorded in this area, 73% did not alter their discharge during intermittent luminous stimulation; 9% gave variable responses, while 18% were definitely influenced. Not only the units influenced by the specific stimuli (luminous), but also the uninfluenced ones, could be clearly modified by the application of non-specific stimuli of acoustic or painful type. These stimuli are effective even if applied on their own in the dark, and can often sensitize to light-flashes units which cannot normally be influenced in this way. The effects of the non-specific stimuli are not linked to the orienting reflex. Indeed they appear even when the stimuli have been reiterated and the orienting reflex has disappeared. Olfactory stimuli, by contrast, have little effect even when they produce intense behavioural effects. The only effect observable is possibly a slight increase in the 'spontaneous' discharge, while the discharge produced by photic stimuli never appears to be changed.

AD-632 120 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
PALPEBRAL ASYMMETRY IN THE DARK ADAPTED OWL (ATHENE NOCTUA) FOLLOWING UNILATERAL IRREVERSIBLE VISUAL DEAFFERENTATION,
by G. Berlucchi, and P. Strata. 1962, 12p. Contract AF 61 (052)-107, AFOSR 4178

Unclassified report

Availability: Published in Arch. Ital. Biol. v100 p248-58 1962. Copies to DDC users only.

Descriptors: (*Vision, Birds), Adaptation (Physiology), Retina, Light, Stimulation, Sleep, Eye, Muscles, Optic nerve, Nerve cells, Blindness, Italy

Unilateral visual deafferentation was obtained in the owl by photocoagulating the optic papilla or by destroying the retina with ischemia. The unilateral retinal inactivation is followed by palpebral asymmetry, which becomes evident when the bird falls asleep or during arousal produced by light sensory stimulations. The asymmetrical behavior of the eyelids consists of the earlier closure and the delayed opening of the blinded eye respectively at the onset and at the end of the sleep. These phenomena are attributed to hypotonia of the levator palpebrae superioris and depressor palpebrae inferioris muscles in the blinded eye. This hypotonia is due to the lack of a tonic discharge, normally arising from the retina. Since the palpebral asymmetry is present also in complete darkness, it is concluded that the retinal dark-discharge drives reflexly the palpebral motoneurons involved in the opening of the eye. (Author)

AD-632 134 Fld. 6/16
NOBEL INST FOR NEUROPHYSIOLOGY STOCKHOLM (SWEDEN)
THE TRANSFER OF OPTIC INFORMATION THROUGH THE LATERAL GENICULATE BODY OF THE RABBIT,
by Geoffrey B. Arden, and Ulf Soderberg. 1960, 26p. Contract AF 61 (052)-119,

Unclassified report

Availability: Published in Optic Messages in Lateral Geniculate Body p521-44. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Stimulation), (*Vision, Cerebral cortex), (*Electrophysiology, Vision), Optic nerve, Nervous system, Physiology, Brain, Electroencephalography, Light, Auditory perception, Visual perception, Retina, Nerve impulses, Rabbits, Sweden

Geniculate responses recorded from rabbits (encephale isole, decorticate encephale isole, classical and midpontine cerveau isole) show the following peculiarities: The resting discharge is often irregularly distributed with most of the spikes appearing in bursts. The response to illumination usually con-

sists of similar bursts. Responses to successive light stimuli vary. The average rate of discharge is largely independent of the light stimulus, particularly in the encephale isole. The bursts are synchronized with the stimulus. Synchronization varies with the intensity of the stimulus. Both in the dark and in flickering light, the average firing rate and the distribution are affected by arousing stimuli. Both increases and decreases in discharge rate are seen. Spontaneous alterations in arousal are accompained by similar effects. Electrical stimulation of the brain-stem reticular formation causes the same effect as natural arousing stimuli. Stimuli that desynchronize slow-wave activity in the electroencephalogram (EEG) are often effective in changing the geniculate activity, even in a state of arousal. The geniculate discharge thus responds over a wider range than the EEG. Removal of the optic-tract input can modify or reverse the geniculate response to unspecific arousing stimuli. Sometimes these stimuli were effective only when the optic-tract input was intact. When the optic nerve is blocked, there is a resting discharge that is closely related to the state of activity of the brain stem, thus indicating a second input to the lateral geniculate body from this structure.

AD-632 135 Fld. 6/16
NOBEL INST FOR NEUROPHYSIOLOGY STOCKHOLM (SWEDEN)
QUANTITATIVE BESTIMMUNG DES BLUTSTROMES IN EINEM NERVOS ISOLIERTEN RINDENLAPPEN DER KATZE (QUANTITATIVE DETERMINATION OF THE BLOOD FLOW IN THE ISOLATED CORTICAL LOBE OF THE CAT),
by F. F. Jobsis, and U. Soderberg. 1960, 8p. Contract AF 61 (052)-119, AFOSR 2907

Unclassified report

Text in German.

Availability: Published in Verhandlungen der Deutschen Gesellschaft fur Kreislaufforschung n27 p301-8, Darmstadt. Copies to DDC users only.

Descriptors: (*Blood circulation, *Cerebral cortex), Nervous system, Physiology, Electroencephalography, Cats, Sweden

AD-632 136 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
ACTION SUPPRESSIVE DU NOYAU CAUDE SUR LA REACTIVITE REFLEXE DU SYSTEME PYRAMIDAL CHEZ LA CHAT (SUPPRESSIVE ACTION OF THE CAUDATE NUCLEUS ON REFLEX ACTION OF THE PYRAMIDAL SYSTEM IN THE CAT),
by Pierre Buser, Horacio Encabo, Pinchas Borenstein, and Robert Courrier. 1961, 4p. Contract AF 61 (052)-103, AFOSR 2684

Unclassified report

Text in French.

Availability: Published in Comptes rendus des seances de l'Academie des Sciences v253 p538-40 Jul 17 1961. Copies to DDC users only.

Descriptors: (*Brain, Electrophysiology), Reflexes, Inhibition, Stimulation, Sensory perception, Nervous system, Physiology, Cats, France

AD-632 137 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
OBSERVATIONS RELATIVES AUX PROJECTIONS DU NEOCORTEX VERS LE NOYAU CAUDE (RELATIVE OBSERVATIONS ON PROJECTIONS OF THE NEOCORTEX TOWARD THE CANDATE NUCLEUS),
by H. Encabo, P. Borenstein, and P. Buser. 1961, 2p. Contract AF 61 (052)-103, AFOSR 2686

Unclassified report

Text in French.

Availability: Published in Journal de Physiologie v53 p434-5 1961. Copies to DDC users only.

Descriptors: (*Brain, Electrophysiology), Cerebral cortex, Stimulation, Chloralose, Curare alkaloids, Nervous system, Physiology, France

AD-632 138 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
ROLE DES AIRES CORTICALES SOMATIQUES DANS LE CONTROLE DE CERTAINES DECHARGES MOTRICES SOMES-THESIQUES (ROLE OF SOMATIC CORTICAL SURFACES IN THE CONTROL OF CERTAIN SOMAESTHETIC MOTOR DISCHARGES).
by P. Ascher, D. Jassik-Gerschenfeld, and M. L. Fanjul-Moles. 1961, 2p. Contract AF 61 (052)-103, AFOSR 2687

Unclassified report

Text in French.

Availability: Published in Journal de Physiologie v53 p254-5 1961. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Motor reactions), Brain, Electrophysiology, Control, Nervous system, Physiology, Cats, France

AD-632 143 Fld. 6/16
LYON UNIV (FRANCE) INSTITUT DE PHYSIOLOGIE
RECHERCHES SUR LES STRUCTURES NERVEUSES ET LES MECANISMES RESPONSABLES DES DIFFERENTES PHASES DU SOMMEIL PHYSIOLOGIQUE (RESEARCH ON THE NERVE STRUCTURES AND MECHANISMS RESPONSIBLE FOR VARIOUS PHASES OF PHYSIOLOGICAL SLEEP),
by M. Jouvet. 1962, 83p. Contract AF 61 (052)-109,

Unclassified report

Text in French.

Availability: Published in Arch. Ital. Biol. v100 p125-206 1962. Copies to DDC users only.

Descriptors: (*Sleep, *Nervous system), Physiology, France, Cats, Brain

AD-632 187 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
SOMATIC FUNCTIONS OF THE NERVOUS SYSTEM,
by P. Buser, and A. Rougeul. 1961, 32p. Contract AF 61 (052)-103,

Unclassified report

Availability: Published in Annual Review of Physiology v23 p387-418 1961. Copies to DDC users only.

Descriptors: (*Nervous system, Physiology), Reviews, Electrophysiology, Brain, Central nervous system, Anatomy, Nerve cells, Nerve fibers, Pain, Conditioned reflex, Sensory perception, Optic nerve, Vestibular apparatus, Cerebral cortex, Neuromuscular transmission, Electro-encephalography, Spinal cord, Reflexes, Drugs, Sleep, France

The review represents an attempt to bring together recent data from the wide and many-faceted field of somatic functions in the nervous system. Because of space limitation, many outstanding papers had to be eliminated and many others summarized too briefly in spite of their high value. Selection reflects only the authors' own interest and tendencies. Presented material is grouped into sections devoted to the usual anatomofunctional entities.

AD-632 191 Fld. 6/16, 6/15, 6/3
SOUTHAMPTON UNIV (ENGLAND) DEPT OF PHYSIOLOGY AND BIOCHEMISTRY
THE EFFECT OF ACETYLCHOLINE, GLUTAMIC ACID AND GABA ON THE CONTRACTIONS OF THE PERFUSED COCKROACH LEG,
by G. A. Kerkut, A. Shapira, and R. J. Walker. 26 Mar 65, 19p.

Unclassified report

Availability: Published in Comparative Biochemistry and Physiology v16 p37-48 1965. Copies to DDC users only.

Descriptors: (*Blattidae, Pharmacology), (*Acetylcholine, Blattidae), (*Glutamic acid, Blattidae), (*Amino acids, Blattidae), Legs, Contraction, Laboratory animals, Insects, Aspartic acid, Serotonin, Great Britain

The perfused cockroach leg preparation is described. The leg gives an increased contraction to the addition of acetylcholine; L-glutamic acid; D-glutamic acid; L-aspartic acid. Increased amounts of acetylcholine, glutamic acid or aspartic acid bring about greater and longer lasting contractions. Addition of 5-HT has little effect, though higher concentrations can cause a slight inhibition of the contraction. GABA has a marked inhibition on the contraction. Higher concentrations bring about more marked and longer lasting inhibition. The effect is quickly reversible. GABA has little inhibitory effect on contractions induced by acetylcholine but it will easily inhibit contractions caused by glutamic acid. (Author)

AD-632 192 Fld. 6/16, 6/1, 6/3
SOUTHAMPTON UNIV (ENGLAND) DEPT OF PHYSIOLOGY AND BIOCHEMISTRY
THE PRESENCE OF GLUTAMATE IN NERVE-MUSCLE PERFUSATES OF HELIX, CARCINUS AND PERIPLANETA,
by G. A. Kerkut, L. D. Leake, A. Shapira, S. Cowan, and R. J. Walker. 18 Feb 65, 23p.

Unclassified report

Availability: Published in Comparative Biochemistry and Physiology v15 p485-502 1965. Copies to DDC users only.

Descriptors: (*Neuromuscular transmission, Invertebrates), (*Gastropoda, Glutamic acid), (*Crustacea, Glutamic acid), (*Blattidae, Glutamic acid), (*Glutamic acid, Invertebrates), Nerves, Muscles, Stimulation, Simulation, Contraction, Thin layer chromatography, Great Britain

The perfusion of nerve-muscle preparations in the snail Helix aspersa, the crab Carcinus maenas and the cockroach Periplaneta americana is described. When the nervous system in these preparations was stimulated, a ninhydrin positive substance (NPS) appeared in the perfusate. The amount of NPS produced was proportional to the number of stimuli. The NPS was identified by thin-layer chromatography as glutamate. The Helix muscle will contract to the addition of 2 x 10 to the -8th power g/ml of glutamate; Periplaneta muscle contracts to the addition of 5 x 10 to the -8th power g/ml glutamate. The role of glutamate as a nerve-muscle transmitter is discussed. (Author)

AD-632 269 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
CAJAL INST MADRID (SPAIN) DEPT OF BIOPHYSICS

NEURONAL PATTERNS ASSOCIATED WITH AFFECTIVE RESPONSES.
Final scientific rept.,
by Fernandez De Molina. 28 Feb 66, 9p. Rept. no. 211,
Contract AF-EOAR-55-65,
AFOSR 66-0713

Unclassified report

Descriptors: (*Brain, Electrophysiology), (*Motor reactions, Neurology), (*Nerve cells, Stimulation), Biophysics, Behavior, Neuromuscular transmission, Spain

The distribution and properties of the 'mass' responses generated in the basal telencephalon and diencephalon after electrical stimulation of the basolateral and medial amygdala were analyzed in cats anesthetized with chloralose. Two groups of fibres were found in the stria terminalis with a conduction velocity of 2.7-3.4 and 0.7-1 m/sec. respectively. Twenty five neuronal units were analyzed in the septum, anterior and dorsolateral hypothalamus and nucleus ventromedialis, the main emphasis being made on their firing patterns and temporal capabilities. (Author)

AD-632 276 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
MISE EN EVIDENCE, CHEZ LE CHAT EVEILLE LIBRE, D' ACTIVITES CORTICALES ASSOCIATIVES N'APPARAISSANT QUE CHEZ L' ANIMAL INATTENTIF (EVIDENCE, IN THE ALERT UNRESTRAINED CAT, OF ASSOCIATIVE CORTICAL ACTIVITY APPEARING ONLY IN THE INATTENTIVE ANIMAL),
by Denise Albe-Fessard, Alberto Mallart, Pierre Aleonard, and Maurice Fontaine. 1961, 4p. Contract AF 61 (052)-103,
AFOSR 743

Unclassified report

Text in French.

Availability: Published in Comptes rendus des seances de l'Academie des Sciences v252 p1060-2 Feb 13 1961. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Electrophysiology), Brain, Nervous system, Physiology, Attention, Cats, France

AD-632 277 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
OBSERVATIONS SUR L'ORGANISATION FONCTIONNELLE DU CORTEX MOTEUR CHEZ LE CHAT (OBSERVATIONS ON THE FUNCTIONAL ORGANIZATION OF THE MOTOR CORTEX IN THE CAT),
by P. Buser. 1960, 45p. Contract AF 61 (052)-103,
AFOSR 3458

Unclassified report

Text in French.

Availability: Published in Bulletin de l'Academie Suisse des Sciences Medicales v16 n5 p355-97 1960. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Motor reactions), Brain, Electrophysiology, Nervous system, Physiology, Sensory perception, Chloralose, Cats, France

The paper describes results concerned with the functional organization of the pyramidal cortex in cat. These data have been obtained, either on 'acute' preparations, some under deep chloralose anaesthesia, others unanaesthetized and curarized, or on normal unrestrained animals, some of them being trained to a motor-alimentary conditioning performance. The existence of visual as well as auditory projections to the anterior sigmoid cortex may be considered as well proved. The presence of a focus for somaesthetic projections, distinct from those for somatic area I and II, is equally confirmed. A microelectrode analysis confirms these facts by showing that a large proportion of single units in the anterior sigmoid gyrus are 'polysensory', ie. may be activated by light, sound, as well as somaesthetic stimuli. Recording from the pyramidal tract at pontine level indicates that all three types of sensory messages may induce a reverberated corticifugal discharge from the motor cortex. Facilitatory effects are observed by combining, with short interval, two stimuli of distinct modalities. Evoked responses at the motor cortex, as well as corresponding pyramidal discharges may be observed, not only under chloralose, but also under curare and on normal animals as well.

AD-632 278 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
REDUCTION AU COURS DU COMPORTEMENT ATTENTIF DE L'AMPLITUDE DES REPONSES EVOQUEES DANS LE CENTRE MEDIAN DU THALAMUS CHEZ LE CHAT EVILLE LIBRE, PORTEUR D'ELECTRODES A DEMEURE (REDUCTION OF THE AMPLITUDE OF RESPONSE EVOKED IN THE CENTER OF THE THALAMUS DURING ATTENTIVE BEHAVIOR OF AN ALERT UNRESTRAINED CAT HAVING IMPLANTED ELECTRODES),
by Denise Albe Fessard,
by Alberto Mallart, Pierre Aleonard, and M. Robert Courrier. 1961, 4p. Contract AF 61 (052)-103,
AFOSR 744

Unclassified report

Text in French.

Availability: Published in Comptes rendus des seances de L'Acedemie des Sciences v252 p187-9 Jan 4 1961. Copies to DDC users only.

Descriptors: (*Thalamus, Electrophysiology), Nervous system, Physiology, ubrain, Stimulation, Sensory perception, Attention, Behavior, Reflexes, Cats, France

AD-632 289 Fld. 6/16, 5/10
CFSTI Prices: HC $1.00 MF $0.50
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
RESEARCH OF NERVOUS PROCESSES UNDERLYING LEARNING BEHAVIOR.
Final rept., 1 May 58-30 Apr 61,
by A. E. Fessard. 30 Apr 61, 16p. Contract AF 61 (052)-103,

Unclassified report

Descriptors: (*Learning, *Central nervous system) Electrophysiology, Nerve cells, Surgery, Pharmacology, Histology, Reflexes, Motor reactions, Sensory perception, Proprioception, Brain, Chloralose, Cats, Mollusca, France

The cat was used as the experimental animal, and ganglia of some Mollusc species were used to treat some basic questions at the neuronal level. The main techniques were surgical, electrophysiological, pharmacological, and histological. Learning, as a behavioral feature, presupposes underlying nervous processes for association of sensory messages, as well as appropriate functional links between the associative operations and those to which they give rise on the efferent side, viz: reflex reactions and voluntary commands; it also necessarily involves the formation and persistence of traces of previous activity.

AD-632 293 Fld. 6/16, 6/5, 6/1
CFSTI Prices: HC $2.00 MF $0.50
SASSARI UNIV (ITALY) FACULTY OF SCIENCES
ENERGETICS TRANSFER IN THE PHOTODYNAMIC REACTIONS. I. PHOTODYNAMIC SENSITIVITY OF THE RETINA. II. PHOTODYNAMIC ACTION AND CANCER. III. PHOTOCHEMICAL SYNTHESIS OF AMINO ACIDS IN ABIOGENIC CONDITIONS.
Final technical rept.,
by Leonida Santamaria. 31 Oct 65, 36p. Contract AF-EOAR-116-63,
AFCRL 66-296

Unclassified report

Descriptors: (*Photosensitivity (Biological), Retina), (*Retina, Photochemistry), (*Cancer, Retina), (*Amino acids, Biosynthesis) Pathology, Polycyclic compounds, Hydrocarbons, Respiration, Glycolysis, Fishes, Electrophysiology, Formaldehyde, Catalysts, Light, Stimulation, Chemoreceptors, Oxygen, Ultraviolet radiation, Inorganic compounds, Nitrogen compounds, Mice, Italy

The S-potentials in response to stimulation by light of individual cells in the retinae of fish depend on relatively high concentration of oxygen and on the physiological integrity of the receptors. This suggests that S-potentials and the natural photodynamic sensitivity of the retina might be based on a common mechanism. The long-ultraviolet irradiation on mice painted with 3,4-benzpyrene produces acceleration or inhibition of cancer induction according to the dosage of light. 3,4-benzpyrene is carcinogenic independently of light. The photochemical synthesis of amino acids in mixture of paraformaldehyde and inorganic catalysts under visible light occurs either in the presence or in the absence of a fixed nitrogen inorganic source. The type of amino acid produced and the rate of its formation are dependent on the inorganic catalyst employed. (Author)

AD-632 301 Fld. 6/16
CFSTI Prices: HC $1.10 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
FINAL REPORT,
by A. Engstrom. 25 Mar 58, 7p. Contract AF 61 (514)-861,

Unclassified report

Descriptors: (*Bone, *Metabolism), Tissues (Biology), Calcium compounds, Strontium compounds, Minerals, Microanalysis, Radiography, Sweden, X-ray photography, Crystallography, Implants, Transplantation, Radioactive isotopes

A summary is given of researches involving the role of skeletal tissues in metabolism, under normal and diseased conditions, from the molecular to the anatomical levels. Results are given in AD-631 903, AD-631 904, AD-631 905, AD-631 906, AD-631 907, and AD-631 908, q.v.

AD-632 307 Fld. 6/16
CFSTI Prices: HC $1.60 MF $0.50
HOPITAL HENRI ROUSSELLE PARIS (FRANCE) LABORATOIRE DE NEUROPHYSIOLOGIE
RELATION OF THE VISCERAL AFFERENTS ON THE ACTIVITY OF THE BRAIN STEM RETICULAR FORMATION.
Annual summary rept. no. 1, 1 Jul 60-30 Jun 61,
by P. C. Dell. 30 Jun 61, 13p. Contract AF 61 (052)-229,
AFOSR 1644

Unclassified report

Descriptors: (*Brain, *Neuromuscular transmission), Autonomic nervous system, Motor reactions, Vestibular apparatus, Respiration, Reflexes, Eye, France

Work was concerned with: (1) The control of sympathetic and parasympathetic discharges regulating pupillary size (2) Respiratory control, and (3)

The control of the vestibulo-ocular reflex arc. Work on this last point is incomplete at the present time.

AD-632 500 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
DETECTION OF CIRCULAR LIGHT SIGNALS IN RELATION TO SHAPE AND COLOR IDENTIFICATION.
Progress rept., 1 Dec 64-1 Feb 65,
by Lucia Ronchi, and Rolando Tittarelli. Feb 66, 18p. Contract AF 61 (052)-850, Task 775509, SAM TR-66-14

Unclassified report

Descriptors: (*Color vision, Geometric forms), (*Visual perception, Signal lights), Thresholds (Physiology), Adaptation (Physiology), Retina, Vision, Space perception, Incandescent lamps, Optical filters, Probability, Ophthalmology, Italy

A small and brief circular spot was flashed at 7 degrees nasal to the fovea. Absolute threshold, color identification threshold, and threshold of perception of the circle were determined. The number of wrong responses given by the subject when attempting to identify the color of the signal and the degeneration of apparent shape under degraded viewing conditions is presented. The radiation emitted by an incandescent lamp, 2800K, was filtered by filters. The threshold of circular shape identification was found to be slightly higher than that of color identification. The findigs were compared with the data reported in the current literature. Practical recommendations for the use of the data are given. (Author)

AD-632 501 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
PAROTID FLUID STEROID AND ELECTROLYTE RESPONSES TO EXERCISE.
Final rept. for Apr 65,
by Ira L. Shannon. Mar 66, 12p. Rept. no. SAM-TR-66-31,
Task 775303,

Unclassified report

Descriptors: (*Salivary glands, Secretion), (*Steroids, Saliva), (*Electrolytes (Physiology), Saliva), (*Exercise, Saliva), Dentistry, Corticosteroid agents, Adrenal cortex, Body weight, Pulse rate

On 5 successive days, 6 subjects underwent a 10-mile, 2-hour hike to investigate the effects of exercise on parotid fluid flow rate, and levels of free 17-hydroxycorticosteroids, sodium, potassium, and chloride in this secretion. Means for the 5 days for all 6 subjects showed no significant differences in these variables that could be related to exercise. There was, thus, no suggestion of altered adrenocortical function or change in electrolytes that might be expected to accompany such an alteration. (Author)

AD-632 503 Fld. 6/16
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
THE EFFECT OF HYDRAZINE ON PROTEIN CONTENT OF VARIOUS TISSUES IN THE RAT,
by William L. Banks,Jr., and Eduardo R. Stein.
14 May 65, 7p. Rept. no. SAM-TR-65-220, Task 630207,

Unclassified report

Availability: Published in Proceedings of the Society for Experimental Biology and Medicine, v120 p1-3 1965. Copies to DDC users only.

Descriptors: (*Liver, Hydrazine), (*Hydrazine, Metabolism), (*Proteins, Biosynthesis), Tissues (Biology), Ribonucleic acids, In vivo analysis, Analysis of variance, Kidneys, Sex glands, Rats

Hydrazine treatment caused an enlargement in the livers of rats which appeared to be associated with increased protein content of that organ. This rise in liver protein content was correlated with an increased liver RNA. Similar changes in protein and RNA were not observed in the kidney and gonads. The hydrazine -induced elevation in both liver protein and RNA content is consistent with a stimulation of protein biosynthesis. Furthermore, the effect of hydrazine on liver protein appears to be primarily metabolic rather than nutritional. (Author)

AD-632 506 Fld. 6/16
CFSTI Prices: HC $1.10 MF $0.50
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
CENTRAL NERVOUS MECHANISMS IN CIRCULATION REGULATION.
Technical rept.,
by Cesare Bartorelli, and Alberto Zanchetti. 31 May 62, 15p. Contract AF 61 (052)-253,

Unclassified report

Descriptors: (*Central nervous system, *Blood circulation), Electrophysiology, Brain, Electroencephalography, Blood pressure, Blood vessels, Respiration, Reflexes, Behavior, Thresholds (Physiology), Stimulation, Inhibition, Cats, Italy

The diencephalic mechanisms for rage were found to be under the inhibitory control of sino-aortic pressoceptors, and to be excited by chemoceptive firing. Inhibitory as well as excitatory effects can be induced also from the reticular formation. Lesion experiments indicate that rage activity is supported by the activating reticular system. Mapping diencephalic responses to somatic stimuli has led to define some limited foci of activation. A tonic inhibitory role on arterial pressure exerted by afferents from heart and lungs is described. (Author)

AD-632 507 Fld. 6/16
CFSTI Prices: HC $1.10 MF $0.50
CAMBRIDGE UNIV (ENGLAND)
UNIT ACTIVITY IN THE HYPOTHALAMUS.
Final technical rept.,
by B. A. Cross, and I. A. Silver. 31 Jan 63, 14p.
Contract AF 61 (052)-301,

Unclassified report

Descriptors: (*Thalamus, Electrophysiology), (*Nerve cells, Thalamus), Hypoxia, Blood, Glucose, Sex hormones, Insulin, Sensory perception, Blood pressure, Pulse rate, Oxygen, Carbon dioxide, Electroencephalography, Nervous system, Physiology, Rabbits, Rats, Great Britain

A study of over 800 units in the hypothalamus and other forebrain areas of more than a hundred animals has confirmed and extended earlier observations on the characteristics of hypothalamic unit activity. The majority of recorded hypothalamic neurones had spontaneous rates of firing in the range of 1-10/sec, and exhibited a more regular pattern of firing than neurones in the cortex or thalamus. The responses of hypothalamic neurones revealed a marked degree of sensory convergence. Usually two or more sensory stimuli excited the same neurone, but inhibitory interactions between differing sensory modalities were also observed. There was little evidence that neurones having particular patterns of activity or responsiveness were situated exclusively in localised areas. Fast unresponsive neurones were common in the subthalamus but also occurred in the ventral thalamus and hypothalamus. Neurones firing in short rapid bursts were found commonly in the thalamus and occasionally in the hypothalamus. Adjacent neurones frequently showed dissimilar behaviour. Hypoxia, hypercapnia and hypoglycaemia had a predominantly excitatory effect on neurones in the posterior and lateral hypothalamic areas, associated with augmented sympathetico -adrenal activity. (Author)

AD-632 522 Fld. 6/16
CAMBRIDGE UNIV (ENGLAND)
SOME FACTORS AFFECTING OXYGEN TEN SION IN THE BRAIN AND OTHER ORGANS.
Revised ed.,
by B. A. Cross, and I. A. Silver. 22 May 62, 17p.
Contract AF 61 (052)-301,
AFOSR 4277

Unclassified repor

Revision of manuscript submitted 12 Jul 61.

Availability: Published in Proceedings of th Royal Society, B, v156 p483-99 1962. Copies i DDC users only.

Descriptors: (*Brain, *Oxygen), Polarogra phic analysis, Nitrogen, Nitrates, Arteries, Obstruction (Physiology), Carbon dioxide, Respiration, Epinephrine, Parenteral infu sions, Testes, Mammary glands, Skin, Thala mus, Stimulation, Hypoxia, Hyperventilation, Nerves, Hypotension, Blood pressure, Blood vessels, Great Britain

Polarographic recording of cerebral oxygen ten sion was performed by means of gold-plated nee dle electrodes oriented stereotaxically in the fore brain of rabbits under light urethane anaesthesia. The indicated mean resting level of oxygen tension in grey matter was 13 mm Hg. Higher levels were recorded in cerebral ventricles and lower levels in white matter. O2 breathing doubled the forebra in oxygen tension and N2 or N2O reduced it near ly to zero. Inhalation of 80% CO2 and 20% O2 produced a threefold increase in oxygen tension. Forebrain oxygen tension was drastically reduced by inhalation of amyl nitrite and by carotid artery occlusion. The oxygen tension recorded in a small coagulated lesion or in dead forebrain was low, and no change resulted when the animal inhaled O2, N2 or CO2. Intravenous injection of 1 to 10 micrograms adrenaline elicited a rise of up to 20% in forebrain oxygen tension and at the same time a fall in the oxygen tension recorded in the testis, lactating mammary gland or skin. Electrical stimulation (15 s) or the lateral or posterior hypothalamus produced an elevation of forebrain oxygen tension persisting for a minute or more after the stimulus, suggesting a release of adrenomedullary adrenaline. Opposite effects were seen in the oxygen tension measured in testis, mammary gland or skin. (Author)

AD-632 550 Fld. 6/16
CAMBRIDGE UNIV (ENGLAND)
MAMMARY OXYGEN TENSION AND THE MILK -EJECTION MECHANISM,
by B. A. Cross, and I. A. Silver. 22 Jul 61, 10p.
Contract AF 61 (052)-301,
AFOSR 2509

Unclassified repor

Availability: Published in J. Endocrin. v23 p375-84 1962. Copies to DDC users only.

Descriptors: (*Mammary glands, Physiology), (*Oxygen, Mammary glands), Milk, Pituitary hormones, Stimulation, Muscles, Blood circulation, Rabbits, Contraction, Great Britain

Polarographic recording of pO2 from gold-plated needle electrodes inserted into lactating mammary glands of rabbits under light urethane anaesthesia gave resting values of 15-30 mm. Hg. Expelling the milk from distended glands raised the pO2 luvel. Myoepithelial contraction (milk ejection) induced by i.v. injection of oxytocin lowered pO2 by an amount depending on the rise in intramammary pressure. Surgical shock, spinal anaesthesia or i.v. injection of adrenaline depressed mammary pO2 and reduced milk-ejection response to i.v. oxytocin. When mammary pO2 was raised by O2 breathing, or lowered by N2 breathing, the milk-ejection response to i.v. oxytocin was not affected. Electrical stimulation of the lateral and posterior hypothalamic areas reduced mammary pO2 and

milk ejection in a way similar to i.v. adrenaline. Bilateral electrolytic lesions in these areas produced a sustained depression of mammary pO2. It is concluded that the pO2 of mammary tissues gives a measure of capillary blood flow and that this, rather than the absolute pO2 level, determines the response of the myoepithelium to circulating oxytocin. (Author)

AD-632 592 Fld. 6/16
CFSTI Prices: HC $1.60 MF $0.50
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE PATHOLOGIE GENERALE
FINAL REPORT, 1 DECEMBER 1956-31 DECEMBER 1962,
by F. Bremer, and J. E. Desmedt. 25 Jan 63, 12p. Contract AF 61 (052)-120,
Unclassified report

Descriptors: (*Sensory perception, Electrophysiology), Nervous system, Physiology, Attention, Cerebral cortex, Cerebellum, Autonomic nervous system, Parasympathomimetic agents, Cholinesterase, Cholinesterase inhibitors, Electroencephalography, Auditory perception, Visual perception, Conditioned reflex, Behavior, Nerve cells, Histology, Brain, Cats, Belgium

Contents: Corpus callosum; Neuropharmacology of cholinergic systems in the reticulo-cortical complex; Centrifugal control in auditory system; Auditory IV area; Analysis of mode of operation of the olivo-cochlear efferent axons; Effect of stimulation of reticular formation on cortical evoked potentials; Effect of chronic partial deafferentiation of cortical areas on their functional properties; Binocular interaction in visual cortex of cats; Cerebello-cerebral relations; Technical developments in the laboratory.

AD-632 612 Fld. 6/16, 6/15
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
CHOLINERGIC TRANSMISSION MECHANISMS FOR BOTH EXCITATION AND INHIBITION IN MOLLUSCAN CENTRAL SYNAPSES,
by L. Tauc, and H. M. Gerschenfeld. 1961, 5p. Contract AF 61 (052)-103,
Unclassified report

Availability: Published in Nature v192 n4800 p366-7 Oct 28 1961. Copies to DDC users only.

Descriptors: (*Acetylcholine, Nerve cells), (*Mollusca, Nerve cells), Autonomic nervous system, Parasympathomimetic agents, Autonomic agents, Electrophysiology, Neuromuscular transmission, Nervous system, Physiology, France

Conclusions are summarized as follows: (1) As was demonstrated elsewhere, acetylcholine, by its effects on Aplysia depilans neurones, enables one to distinguish two types of cells: D-cells, depolarized and excited by the drug, and H-cells, hyperpolarized and inhibited. The D-neurones only show excitatory synaptic input, whereas H-neurones present both excitatory and inhibitory synaptic input. (2) In D-neurones, the synaptic excitatory input may be considered as cholinergic. (3) In H-neurones, inhibitory input is also very likely cholinergic, but the excitatory input in these cells appears to depend on another, unknown chemical transmitter. Hence, the character of synaptic transmission, excitatory in D-cells and inhibitory in H-cells, does not depend solely on the nature of the chemical transmitter--acetylcholine in both cases--but on physicochemical differences in the postsynaptic membrane that react in a specific way to the transmitter. (4) Existence of interneurones which would simultaneously induce excitatory and inhibitory synaptic actions in different postsynaptic neurones is a real possibility.

AD-632 613 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
DUALITE DES RESPONSES DES CELLULES DU CENTRE MEDIAN DU THALAMUS A DES STIMULATIONS NATURELIES OU ELECTRIQUES (QUALITY OF THE RESPONSES OF CELLS OF THE CENTRAL THALAMUS BY NATURAL OR ELECTRICAL STIMULATIONS),
by Denise Albe-Fessard, and M. Lawrence Kruger. 1959, 3p. Contract AF 61 (052)-103,
Unclassified report

Text in French.

Availability: Published in Comptes rendus des seances de l'Academie des Sciences v248-301 Jan 12 1959. Copies to DDC users only.

Descriptors: (*Thalamus, Electrophysiology), Brain, Stimulation, Nervous system, Physiology, Reflexes, Cats, France

AD-632 614 Fld. 6/16, 6/15
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE PATHOLOGIE GENERALE
MECANISMES NEURO-HUMORAUX ET SYNERGIE RETICULO-CORTICALE (NEURO-HUMORAL FACTORS INFLUENCING THE ELECTRICAL ACTIVITY OF THE CEREBRAL CORTEX),
by J. E. Desmedt, and L. Franken. 1957, 5p. Contract AF 61 (514)-1112,
Unclassified report

Text in French.

Availability: Published in First Internat. Congress Neurol. Sci., Brussels v3 p356-60 1957. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Electrophysiology), (*Cholinesterase inhibitors, Cerebral cortex), Amphetamines, Electroencephalography, Nervous system, Physiology, Cats, Belgium

AD-632 615 Fld. 6/16
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE PATHOLOGIE GENERALE
SUR UN PHENOMENE D'INHIBITION CENTRIFUGE DANS LA VOIE ACOUSTIQUE CENTRALE CHES LE CHAT (ON THE PHENOMENON OF CENTRIFUGAL INHIBITION IN THE CENTRAL ACOUSTIC TRACT IN THE CAT),
by J. E. Desmedt, and K. Mechelse. 1957, 4p. Contract AF 61 (514)-1112,
Unclassified report

Text in French.

Availability: Published in Comptes rendus des seances de la Societe de Biologie v12 p2209-12 Dec 21 1957. Copies to DDC users only.

Descriptors: (*Auditory perception, Electrophysiology), Inhibition, Brain, Stimulation, Sensory perception, Nervous system, Physiology, Cats, Belgium

AD-632 616 Fld. 6/16, 6/15
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE PATHOLOGIE GENERALE
MODE OF ACTION OF THE EFFERENT OLIVO-COCHLEAR BUNDLE ON THE INNER EAR,
by J. E. Desmedt, and P. Monaco. 30 Dec 61, 5p. Contract AF 61 (052)-120,PHS-B-2482
Unclassified report

Availability: Published in Nature, v192 n4809 p1263-5 Dec 30 1961. Copies to DDC users only.

Descriptors: (*Auditory nerve, Physiology), Ear, Nervous system, Electrophysiology, Auditory perception, Strychnos alkaloids, Nerve cells, Belgium

AD-632 617 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
ATTIVITA PIRAMIDALE NEL GATTO DURANTE LA VEGLIA ED IL SONNO FISIOLOGICO (PYRAMIDAL ACTIVITY IN THE CAT DURING AN AWAKENED AND SLEEPING STATE),
by A. Arduini, G. Berlucchi, and P. Strata. 1962, 3p. Contract AF 61 (052)-107,
Unclassified report

Text in Italian. Prepared for presentation at Congresso Nazionale di Fisiologia Padova, 3-6 Oct 1962.

Availability: Published in Bollettino della Societa Italiana de Biologia Sperimentale v38 p1607-9 1962. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Nervous system, Physiology, Brain, Attention, Electrophysiology, Cats, Italy

AD-632 618 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
BRAIN STEM ELECTRICAL ACTIVITY DURING DEEP SLEEP,
by D. C. Brooks, and E. Bizzi. 1963, 20p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Archives Italiennes de Biologie v101 n4 p648-65 1963. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Electrophysiology, Brain, Eye, Motion, Cats, Italy

In the sleeping cat, frequent discrete episodes of deep sleep were observed, during which the cortical EEG developed low voltage fast activity, the posterior cervical EMG became flat, and erratic eye movements were recorded. Theta activity was consistently recorded from the hippo-campus during deep sleep. During deep sleep a distinctive pattern of electrical activity was recorded from three regions: a broad zone of the pons at the level of the nucleus reticularis pontis caudalis, the oculomotor nucleus and the lateral geniculate nucleus. This pattern, which has been termed deep sleep wave activity, consisted of intermittent groups of essentially monophasic waves having a rather uniform amplitude. At the onset of a deep sleep episode, the appearance of deep sleep waves preceded the changes in the EEG, EMG and eye movement recordings. Groups of deep sleep waves appeared synchronously with groups of eye movements during deep sleep. (Author)

AD-632 619 Fld. 6/16
ALGIERS UNIV (ALGERIA)
EEG-ACTIVATING INFLUENCES IN THE CERVEAU ISOLE PREPARATION,
by Giuseppe Moruzzi. 1961, 5p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Prospectives in Biology (Netherlands) p434-8 nd. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Eye, Motion, Reflexes, Cerebrum, Retina, Brain, Behavior, Cats, Italy

The experiments suggest that tonically active desynchronizing structures are present in the isolated cerebrum following post-collicular transection. These structures would be driven reflexively by a tonic retinal inflow, which in the complete absence of light obviously corresponds to the retinal dark discharge. It is likely that the behavioral

and EEG activation following chronic midbrain transection is due to a compensatory enhancement of the tonic discharge of these structures, which in the acute preparation would simply counteract, but never overwhelm, the strong tendency to synchronization of the cerveau isole. The same explanation might hold true for the predominance of low-voltage fast activity in the chronic cerveau isole dog. The present data do not permit the identification of the structures which are responsible for this activating influence: the limbic midbrain area and the hypothalamus are obvious candidates.

AD-632 620 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
THE EFFECTS OF FLICKER AND STEADY ILLUMINATION ON THE ACTIVITY OF THE CAT VISUAL SYSTEM,
by A. Arduini, and L. R. Pinneo. 1963, 23p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Archives Italiennes de Biologie v101 n4 p508-29 1963. Copies to DDC users only.

Descriptors: (*Visual perception, Brightness), Light, Stimulation, Vision, Adaptation (Physiology), Illumination, Retina, Nerve impulses, Intensity, Cats, Italy

The amount of activity of the optic chiasm and dorsal nucleus of the lateral geniculate body, was measured in response to flickering light alone, steady light alone, and combinations of flicker and steady illumination. Animals were nembutal anesthetized and awake chronically prepared cats. Flicker frequency was varied from 4 to 51 flashes per second with equal light and dark intervals, and level of illumination was varied over three log units. There were no significant differences other than in magnitude of activity between responses in the geniculate and chiasm, or between anesthetized and chronic animals. Activity of the visual system was found to be increased over the level of the dark discharge by low frequency flickering light, but was substantially depressed below the level of dark discharge with high frequencies of flicker. In general, the drop in tonic activity was linearly related to flicker frequency, but tended to reach a steady level at the highest frequencies. The final level of activity at the highest frequencies was slightly higher than the level produced by a steady illumination of the same intensity. Increased levels of illumination: (1) increased the level of activity at low frequencies of flicker higher than low levels of illumination; (2) depressed the level of activity a high frequencies of flicker lower than low levels of illumination; (3) shifted the relation of activity to flicker frequency to the left, so that the functions crossed the level of dark discharge at lower frequencies of flicker than with low levels of illumination. (Author)

AD-632 621 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
FUNCTIONAL CONNECTIONS BETWEEN PONTINE RETICULAR FORMATION AND LATERAL GENICULATE NUCLEUS DURING DEEP SLEEP,
by E. Bizzi, and D. C. Brooks. 1963, 16p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Archives Italiennes de Biologie v101 n4 p666-80 1963. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Brain, Stimulation, Nervous system, Physiology, Retina, Eye, Motion, Cats, Italy

The waves present in the pontine reticular formation and the lateral geniculate nucleus during deep sleep were found to be synchronous. During deep sleep, low frequency (2/sec or less) stimulation of the pons at the level of the nucleus reticularis pontis caudalis led to a response in the lateral geniculate nucleus which consisted of either a single wave or a group of 2-3 waves. The latency of this wave (or the first wave of the group was 25-35 msec. The wave responses in the lateral geniculate nucleus following pontine stimulation appeared identical to spontaneous deep sleep waves recorded from the same point. During synchronized sleep and arousal it was impossible to produce wave responses in the lateral geniculate nucleus by stimulation of the pons. During deep sleep, synchronized sleep and arousal it was impossible by stimulating the lateral geniculate nucleus to produce pontine responses resembling deep dsleep waves. Deep sleep waves could not be recorded from the optic chiasm and optic tract. Deep sleep waves were still present in the lateral geniculate nucleus of animals in which the visual cortex had been removed. The results presented here indicate that the deep sleep wave activity recorded from the lateral geniculate nucleus is dependent upon an extraretinal input to this structure. They further suggest that this activity may be a response to ascending impulses reaching the lateral geniculate nucleus from the pontine reticular formation. (Author)

AD-632 622 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
OCULAR MOVEMENTS IN THE MIDPONTINE PRETRIGEMINAL PREPARATION,
by F. A. King, and P. L. Marchiafava. 1963, 13p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Arch. Ital. Biol. v101 p149-60 1963. Copies to DDC users only.

Descriptors: (*Nystagmus, Electroencephalography), Eye, Motion, Attention, Nerves, Reflexes, Brain, Nervous system, Physiology, Cats, Italy

The original purpose of this study was to examine further the suggestion that the midpontine pretrigeminal preparation with a consistently low voltage, fast EEG is actually awake by determining what correlations exist between type of EEG pattern and vertical optokinetic nystagmus. We found, however, that complete transection results in a total loss of the optokinetic reflex regardless of the form of cortical electrical activity. Inasmuch as the pretrigeminal preparation still responds to objects moving in the visual field by vertical following eye movements, the lack of optokinetic nystagmus is not interpreted as an indication that the animal is actually not awake. It is hypothesized that interference with reflex circuitry may account for the failure of the optokinetic reflex. The following findings indicate that vertical optokinetic nystagmus and vertical following movements require different central mechanisms and stimulus conditions for their elicitation: (i) optokinetic reflex is absent, and following movements present in the cat transected at the midpontine pretrigeminal level, (ii) optokinetic reflex is present and following movements absent in visual decorticate animals, (iii) optokinetic nystagmus does not show habituation, while following movements do, (iv) optokinetic reflex nystagmus occurs when a visual field consists only of moving contrasting figures in the absence of a reference background, while following movements require a moving figure against a visually stationary ground. (Author)

AD-632 623 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
PONTINE RETICULAR FORMATION: RELATION TO LATERAL GENICULATE NUCLEUS DURING DEEP SLEEP,
by Emilio Bizzi, and Dana C. Brooks. 8 Apr 63, 2p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Science v141 n3577 p270-2 Jul 19 1963. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Brain, Stimulation, Nervous system, Physiology, Cats, Italy

Irregular groups of monophasic waves (seven waves per second) appear synchronously in the pontine reticular formation and in the lateral geniculate nucleus during the deep (low-voltage, fast) phase of sleep. The geniculate potentials can be triggered by low-rate stimulation of the pontine reticular formation, but the reverse effect has never been obtained. (Author)

AD-632 624 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
PYRAMIDAL ACTIVITY DURING SLEEP AND WAKEFULNESS,
by A. Arduini, G. Berlucchi, and P. Strata. 1963, 16p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Arch. tal. Biol. v101 p530-44 1963. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Attention, Brain, Central nervous system, Cerebral cortex, Nerve cells, Stimulation, Cats, Italy

The actual level of the pyramidal activity during wakefulness and various stages of sleep has been studied in normal cats with chronically implanted electrodes into the pes penduculi and/or the bulbar pyramids. A method for quantitative analysis of tonic activity in the central nervous system has been employed. Results may be summarized as follows. During wakefulness the pyramidal discharge attains a quasi steady value, provided that the animal does not accomplish large movements. During the stage of sleep characterized by EEG with high voltage, low frequency waves and activity still present in the neck muscles, the mean level of pyramidal activity is noticeably lower than during wakefulness. Peaks of discharge, synchronous with the spindle trains of the EEG, characterize the pyramidal activity in this stage. Corresponding to the transition from the phase of sleep just described to the 'fast' type of sleep, with low amplitude, fast EEG waves and muscular atonia, the base line of the pyramidal record rises to a level equal to, or higher than, that reached during wakefulness. This level is maintained throughout this stage, with some short-lasting peaks of discharge synchronous with the muscular twitches. (Author)

AD-632 625 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
THE TONIC ACTIVITY OF THE LATERAL GENICULATE NUCLEUS IN DARK AND LIGHT ADAPTATION,
by A. Arduini, and L. R. Pinneo. 1963, 16p. Contract AF 61 (052)-107,
Unclassified report

Availability: Published in Arch. Ital. Biol. v101 p493-507 1963. Copies to DDC users only.

Descriptors: (*Retina, Adaptation (Physiology)), Vision, Electrophysiology, Brain, Nervous system, Physiology, Optic nerve, Nerve impulses, Electroencephalography, Cerebral cortex, Illumination, Nerve cells, Cats, Italy

Experiments conducted on cats in Nembutal anesthesia, midpontine pretrigeminals, cerveau isole and intact -brain with chronically implanted electrodes, have shown that the activity of the lateral geniculate nucleus closely the changes of level of the retinal output, as described in a previous paper. When the retina is continuously and diffusely illuminated the overall activity of the lateral geniculate decreases following the decrease in the level of the retinal output. During reversible retinal black-out, the overall activity of the lateral genicu-

late of the anesthetized animal decreases dramatically, reaching the level of the noise measured in the dead animal. Part of the activity remains in non-anesthetized preparations. The results are discussed in relation to the technique used and its interpretation, and to the presence of a second input to the geniculate nucleus. (Author)

AD-632 633 Fld. 6/16
CAMBRIDGE UNIV (ENGLAND) PSYCHOLOGICAL LAB
VISUAL FIELD DEFECTS IN MONKEYS,
by A. Cowey. 1966, 3p. Contract AF 61 (052)-185,
Unclassified report

Availability: Published in Nature v193 n4812 p302 Jan 20 1962. Copies to DDC users only.

Descriptors: (*Vision, Psychophysiology), Monkeys, Great Britain, Blindness

AD-632 635 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
ASCENDING AFFERENT PATHWAYS MAINTAINING SHAM RAGE BEHAVIOUR IN THE ACUTE DECORTICATE CAT,
by J. Apelbaum, E. Bizzi, A. Malliani, and A. Zanchetti. 1961, 1p. Contract AF 61 (052-253,
Unclassified report

Prepared for presentation at the International Congress of Electroencephalography and Clinical Neurophysiology (5th) Rome, Italy 7-13 Sept. 1961.

Availability: Published in Excerpta Medica, International Congress Series no. 37 p179. Copies to DDC users only.

Descriptors: (*Behavior, Neurology), (*Brain, Electrophysiology), Cerebral cortex, Thalamus, Nervous system, Physiology, Reflexes, Electroencephalography, Cats, Italy

AD-632 636 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
CARDIOPULMONARY ORIGIN OF VAGAL AFFERENT FIBERS EXERTING A TONIC REFLEX INFLUENCE OF THE CIRCULATION,
by M. Guazzi, A. Libretti, and A. Zanchetti. 31 Oct 61, 5p. Contract AF 61 (052)-253,
Unclassified report

Availability: Published in Separatum Experientia v18 n234 p1-4 1962. Copies to DDC users only.

Descriptors: (*Cardiovascular system, Nerves), Heart, Lungs, Nerve fibers, Blood circulation, Italy

AD-632 637 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
COMPORTAMENTO DI FALSA RABBIA NEL GATTO DECORTICATO DOPO INTERRUZIONE DELLE VIE DI PROIEZIONE ASCENDENTE ALL'IPOTALAMO (SHAM RAGE BEHAVIOR OF THE ACUTE DECORTICATE CAT AFTER INTERRUPTION OF ASCENDING PATHWAYS TO THE HYPOTHALAMUS),
by G. Carli, A. Malliani, and A. Zanchetti. Oct 61, 4p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian; Attached Summary in English.

Availability: Published in Dal Bollettino Della Societa Italiana di Biologia Sperimentale v37 n24 p1398-9 1961. Copies to DDC users only.

Descriptors: (*Behavior, Neurology), (*Brain, Electrophysiology), Thalamus, Nervous system, Physiology, Cats, Italy

Sham rage behavior persists unmodified after acute interruption of the mammillary peduncle system either at the caudal or at the rostral midbrain level, or after destruction of the rostral pole of the mesencephalic gray matter. (Author)

AD-632 638 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
DISTRIBUZIONE DELLE RISPOSTE EVOCATE NEL DIENCEFALO DALLA STIMOLAZIONE SOMATICA (DISTRIBUTION OF SOMATICALLY EVOKED RESPONSES IN THE DIENCEPHALON),
by P. Rudomin, G. Carli, A. Malliani, and A. Zanchetti. 1961, 4p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian; Attached Summary in English.

Availability: Published in Dal Bollettino Della Societa Italiana di Biologia Sperimentale v37 n24 p1396-7 1961. Copies to DDC users only.

Descriptors: (*Brain, Electrophysiology), Nervous system, Physiology, Nerve impulses, Electroencephalography, Sensory perception, Cats, Italy

The basal diencephalon of locally anesthetized cats, immobilized with gallamine, has been explored with stereotaxically oriented electrodes while the superficial radial nerve was stimulated with single pulses. Potential distribution when leading with concentric bipolar needle electrodes, has been compared with the distribution of evoked responses when the inner core (180 micra in diameter) of the needle electrode was used as exploring element against an indifferent electrode on the scalp (so called monopolar recording). The diencephalic area which appears to be activated by somatic impulses when the 'monopolar' arrangement is used is much larger than the area where from responses are recorded with the bipolar concentric lead. The possibility that unipolar leads may also record activity spread from some distance is discussed. (Author)

AD-632 639 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
EFFETTI DELLA STIMOLAZIONE ELETTRICA DEL NERVO AORTICO NEL GATTO TALAMICO ACUTO (EFFECTS OF ELECTRICAL STIMULATION OF THE AORTIC NERVE IN A CAT),
by G. Baccelli, M. Gauzzi, A. Libretti, and A. Zanchetti. 1963, 4p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian.

Availability: Published in Bollettino Della Societa Italiana di Biologia Sperimentale v39 n1 p42-4 1963. Copies to DDC users only.

Descriptors: (*Aorta, Nerves), (*Nerves, Stimulation), Electric currents, Electrophysiology, Italy

AD-632 640 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
EFFETTI DELLA VENTILAZIONE POLMONARE SULLE RISPOSTE CIRCOLATORIE ALLA STIMOLAZIONE ELETTRICA DEL NERVO SENOCAROTICO NEL GATTO DECEREBRATO (EFFECT OF PULMONARY VENTILATION ON THE CIRCULATORY RESPONSES TO ELECTRIC STIMULATION OF CAROTID SINUS NERVE IN A DECEREBRATED CAT),
by M. Guazzi. 1964, 6p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian.

Availability: Published in Bollettino Della Societa Italiana di Biologia Sperimentale v40 n16 p980-3 1964. Copies to DDC users only.

Descriptors: (*Cardiovascular system, Respiration), (*Nerves, Stimulation), Arteries, Cats, Lungs, Italy

AD-632 641 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
EVOKED ELECTRICAL RESPONSES TO SOMATIC STIMULI IN THE BASAL DIENCEPHALON OF THE CAT,
by P. Rudomin, M. Borlone, A. Malliani, and A. Zanchetti. 1961, 1p. Contract AF 61 (052)-253,
Unclassified report

Presented at the International Congress of Electroencephalography and Clinical Neurophysiology (5th), Rome, Italy, 7-13 Sep 61.

Availability: Published in Excerpta Medica, International Congress (537) p212 nd. Copies to DDC users only.

Descriptors: (*Thalamus, Electrophysiology), Brain, Electroencephalography, Nervous system, Physiology, Stimulation, Cats, Italy

AD-632 642 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
INHIBITORY CONTROL OF SINOCAROTID PRESSOCEPTIVE AFFERENTS ON HYPOTHALAMIC AUTONOMIC ACTIVITY AND SHAM RAGE BEHAVIOR,
by C. Bartorelli, E. Bizzi, A. Libretti, and A. Zanchetti. 1959, 20p. Contract AF 61 (052)-253,
Unclassified report

Availability: Published in Arch. ital. Biol. v98 p308-26 1960. Copies to DDC users only.

Descriptors: (*Behavior, Neurology), (*Thalamus, Electroencephalography), (*Automatic nervous system, Control), (*Neuromuscular transmission, Inhibition), Brain, Reflexes, Nerves, Sensory mechanisms, Italy

In acute decorticate cats, carotid occlusion below a carotid sinus blind-sac induced outbursts of sham rage which were potentiated by bilateral cervical vagotomy, and abolished by section of Hering's nerves. Sham rage outbursts followed carotid occlusion even when carotid body chemoceptors had been inactivated by embolization with a lycopodium suspension, a finding showing that this effect of carotid occlusion results from transient suppression of pressoceptive discharges, independently of chemoceptive co-excitation. Upper brain mechanisms are indispensable for the appearance of sham rage patterns upon carotid occlusion, since the latter procedure failed to evoke any pseudoaffective reactions when midbrain and diencephalon were temporarily inactivated by injection of a minute dose of Thiopental into the external carotid circulation. Pressoceptive stimulation by increasing intrasinusal pressure succeeded in blocking spontaneously occuring outbursts of sham rage, but appeared much less effective in influencing evoked pseudoaffective activity. It is concluded that the central neural mechanisms responsible for sham rage behavior are also within the sphere of the inhibitory influence of sinocarotid pressoceptors. (Author)

AD-632 643 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
LESIONI DI VIE MESENCEFALO-LIMBICHE E LORO EFFETTO SULL'ELETTROENCEFALO-GRAMMA DEL SONNO PROFONDO DEL GATTO (LESIONS OF THE MESENCEPHALOLIMBIC PATHS AND THEIR EFFECT ON THE

ELECTROENCEPHALOGRAM OF DEEP SLEEP IN A CAT),
by G. Carli, V. Armengol, and A. Zanchetti.
1963, 3p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian.

Availability: Published in Bollettino della Societa, Italiana di Biologia Sperimentale v34 n14 p806-7 1963. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), (*Neurology, Sleep), Cats, Italy

AD-632 644 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
MIDBRAIN COURSE OF DESCENDING PATHWAYS MEDIATING SHAM RAGE BEHAVIOR,
by Giancarlo Carli, Alberto Malliani, and Alberto Zanchetti. 25 Oct 62, 15p. Contract AF 61 (052)-253,
Unclassified report

Availability: Published in Experimental Neurology v7 n3 p210-23 Mar 1963. Copies to DDC users only.

Descriptors: (*Behavior, Neurology), (*Brain, Neuromuscular transmission), (*Neuromuscular transmission, Control), Cats, Italy, Nerves, Stimulation, Thalamus

The midbrain course of descending pathways mediating sham rage behavior was investigated in thalamic cats. Electrical stimulation of the lateral hypothalamus was tested for rage outbursts before and following various lesions in the midbrain. The following lesions were found not to impair transmission of the descending hypothalamic influences: transection of the rostral third of the central periaqueductal gray and adjacent tegmentum, with interruption of the hypothalamic component of Schutz's dorsal longitudinal fasciculus; midline lesions, including the medial component of the medial forebrain bundle to the ventral tegmental area of Tsai and to the caudal periaqueductal gray; and lateral tegmental lesions involving the lateral component of the medial forebrain bundle to the lateral midbrain tegmentum. Large lesions involving most, though not all, of the tegmentum at the midcollicular level impaired, but did not abolish, rage responses to lateral hypothalamic stimulation. It is concluded that descending connections from the lateral hypothalamus, responsible for the peripheral manifestations of rage, are diffuse through the midbrain, including both the lateral and the medial components of the medial forebrain bundle, and possibly the dorsal longitudinal fasciculus as well. (Author)

AD-632 645 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
ORIGINE LOCALE O REMOTA DEI POTENZIALI EVOCATI DIENCEFALICI REGISTRATI CON DERIVAZIONI MONOPOLARI E BIPOLARI: ESPERIMENTI CON LESIONI LOCALIZZATE (LOCAL AND REMOTE ORIGIN OF INDUCED DIENCEPHALIC POTENTIALS RECORDED WITH MONOPOLAR AND BIPOLAR CURRENTS: EXPERIMENTS WITH LOCALIZED LESIONS),
by A. Malliani, P. Rudomin, and A. Zanchetti.
1963, 4p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian.

Availability: Published in Bollettino Della Societa Italiana di Biologia Sperimentale v39 n1 p44-6 1963. Copies to DDC users only.

Descriptors: (*Electroencephalography, *Brain), Electric currents, Italy

AD-632 646 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
REFLEX CHEMOCEPTIVE EXCITATION OF DIENCEPHALIC SHAM RAGE BEHAVIOR,
by E. Bizzi, A. Libretti, A. Malliani, and A. Zanchetti. 9 Nov 60, 5p. Contract AF 61 (052)-253,
Unclassified report

Availability: Published in American Journal of Physiology v200 n5 p923-6 May 1961. Copies to DDC users only.

Descriptors: (*Behavior, Neurology), (*Brain, Reflexes), (*Chemoreceptors, Stimulation), Cats, Thalamus, Italy, Emotions, Thresholds (Physiology), Electroencephalography

In acute thalamic cats, excitation of the carotid body chemoceptors was induced by intrasinusal injection of lobeline (IO micrograms) or by administering low oxygen mixtures (5-12% O2 in N2). Bilateral section of the cervical vago-aortic trunks, preliminary to the experiment, permitted the exclusion of the aortic chemoceptive areas from our study. Stimulation of the carotid body chemoceptors was constantly capable of evoking sham rage outbursts identical in pattern and intensity to those induced by tactile or noxious stimulation or occurring spontaneously. When low-intensity stimulation was used (IO-12% O2) the rage fits were preceded in time by signs of excitation of the medullary respiratory and vasomotor centers. Since lobeline and hypoxia became unable to evoke sham rage outbursts following selective inactivation of the carotid body chemoceptors it is concluded that the diencephalic mechanisms for rage behavior are within the sphere of influence of chemoceptive reflexes. (Author)

AD-632 647 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
SOMATIC FUNCTIONS OF THE NERVOUS SYSTEM,
by Alberto Zanchetti. 1963, 39p. Contract AF 61 (052)-253,
Unclassified report

Availability: Published in Annual Review of Physiology, v24 p287-324 1962. Copies to DDC users only.

Descriptors: (*Sensory mechanisms, Physiology), (*Nervous system, Physiology), Electrophysiology, Brain, Sleep, Stimulation, Italy, Reviews

A review is given of research onwakefulness, sleep, and control mechanisms of the reticular formation.

AD-632 648 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
SULL'ORIGINE INTRATORACICA DELLE FIBRE AFFERENTI VAGALI 'ESTRA-AORTICHE' CHE PARTECIPANO ALLA REGOLAZIONE TONICA DELLA PRESSIONE ARTERIOSA (ON THE INTRATHORACIC ORIGIN OF NON-AORTIC VAGAL AFFERENTS PARTICIPATING TO THE TONIC REGULATION OF ARTERIAL PRESSURE),
by M. Guazzi, A. Libretti, and A. Zanchetti.
1962, 4p. Contract AF 61 (052)-253,
Unclassified report

Text in Italian. Attached summary in English.

Availability: Published in Dal Bollettino Della Societa' Italiana di Biologia Sperimentale, v37 n24 p1350-1 1961. Copies to DDC users only.

Descriptors: (*Cardiovascular system, Nerves), (*Nerves, Blood pressure), Blood vessels, Aorta, Chloralose, Atropine, Heart, Lungs, Cats, Italy

Unanesthetized decerebrate cats and intact cats under chloralose were prepared with denervation of both carotid sinuses, section of the right vago-aortic trunk and of the left aortic nerve. Efferent vagal activity being blocked by atropine, the afferent mechanisms involved in the arterial pressure rise following intrathoracic interruption of the remaining left vagus were studied. Intrathoracic section of the nerve yielded pressor effects only when performed above the various branchings of the nerve towards heart and lungs. (Author)

AD-632 649 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
TONIC REFLEX REGULATION OF THE CAT'S BLOOD PRESSURE THROUGH VAGAL AFFERENTS FROM THE CARDIOPULMONARY REGION,
by Maurizio Guazzi, Arnaldo Libretti, and AlbertoZanchetti. 29 Nov 61, 11p. Contract AF 62 (051)-253,
Unclassified report

Availability: Published in Circulation Research v11 n1 pt1 p7-16 Jul 1962. Copies to DDC users only.

Descriptors: (*Cardiovascular system, Nerves), (*Nerves, Blood pressure), Reflexes, Chloralose, Blood circulation, Atropine, Obstruction (Physiology), Carbon dioxide, Chemoreceptors, Heart, Lungs, Inhibition, Cats, Italy

In unanesthetized decerebrate cats, and in a few intact animals under chloralose anesthesia, the circulatory effects of either cervical or intrathoracic vagus sectioning after interruption of both aortic nerves were studied. All animals received vagolytic doses of atropine, so that the effects of vagal section could be ascribed to abolition of afferent influences only. The amplitude of the pressor response to carotid occlusion is always increased by cutting the aortic nerves, and further augmented by blockade of cervical vagal conduction. After complete sino -aortic deafferentation, the basal level of the arterial pressure shows an additional increase when the cervical vagi are sectioned. The effects of cervical vagal interruption on both the amplitude of the carotid occlusion response and basal arterial pressure are independent of changes in alveolar CO2 concentration, or of hemodynamic alterations consequent on the changed respiratory pattern of the vagotomized animal. The effects of cervical vagal interruption are unlikely to result from sectioning fibers from aortic receptors. Indeed, no important contribution of chemoceptive (and presumably baroceptive) afferents from this region appears to be carried through the left vagus nerve.

AD-632 650 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
TONIC REFLEX REGULATION OF THE CAT'S BLOOD PRESSURE THROUGH VAGAL 'NON-AORTIC' AFFERENTS,
by M. Guazzi, A. Libretti, and A. Zanchetti. 30 Oct 61, 5p. Contract AF 61 (052)-253,
Unclassified report

Availability: Published in Experientia v18 p185 1962. Copies to DDC users only.

Descriptors: (*Cardiovascular system, Nerves), (*Nerves, Blood pressure), Respiration, Reflexes, Aorta, Carbon dioxide, Obstruction (Physiology), Hypertension, Chemoreceptors, Blood circulation, Chloralose, Cats, Italy

The experiments have succeeded in demonstrating the quantitative importance of the tonic reflex influence exerted by afferent vagal fibers on arterial pressure, its independence of concomitant respiratory changes, and that its origin is different from that of the classical afferent fibers running in the aortic nerve.

AD-632 653 Fld. 6/16, 6/15
EDINBURGH UNIV (SCOTLAND) DEPT OF PHYSIOLOGY
THE EFFECT OF OESTROGENS AND SYMPATHETIC DENERVATION ON THE RESPONSE TO OXYTOCIN OF THE BLOOD VESSELS IN THE HIND LIMB OF THE DOG,
by Sybil Lloyd, and Mary Pickford. 6 Apr 62, 10p. Contract AF 61 (052)-272,
Unclassified report

Availability: Published in J. Physiol. v163 p362-71 1962. Copies to DDC users only.

Descriptors: (*Blood vessels, Vasoactive agents), (*Pituitary hormones, Blood circulation), (*Estrogens, Blood circulation), Autonomic nervous system, Sympatholytic agents, Pregnancy, Dogs, Great Britain

Observations were made on the blood flow through the hind limb of anaesthetized dogs, with a Pavlov stromuhr. In normal male and female dogs, intravenous or intra-arterial injection of oxytocin caused an increase in the rate of blood flow through the limb. In dogs pre-treated with an oestrogen, or given intravenous oestrogen during the course of an acute experiment, similar doses of oxytocin caused a reduction in the rate of blood flow. Sympathetic blocking agents changed the normal dilator effect of oxytocin to a constrictor effect. Following unilateral lumbar sympathectomy, oxytocin caused a dilatation in the normal leg, but a constriction in the denervated limb. This effect persisted until the fifth day, after which oxytocin caused a dilatation in both the innervated and denervated limbs. In the dog, as was previously shown the rat, the response to oxytocin is affected in the same manner by the administration of either oestrogens or sympathetic blocking agents. (Author)

AD-632 654 Fld. 6/16, 6/15
EDINBURGH UNIV (SCOTLAND) DEPT OF PHYSIOLOGY
THE EFFECTS OF SINGLE DOSES OF DEOXYCORTICOSTERONE ACETATE (DOCA) AND CORTISONE ON THE VASCULAR RESPONSE OF FEMALE RATS TO POSTERIOR PITUITARY HORMONES,
by L. H. Honore. 18 Apr 62, 11p. Contract AF 61 (052)-272,
Unclassified report

Availability: Published in Quarterly Journal of Experimental Physiology v47 p334-44 1962. Copies to DDC users users.

Descriptors: (*Corticosteroid agents, Blood vessels), (*Pituitary hormones, Blood vessels), (*Blood vessels, Vasoactive agents), (*Autonomic nervous system, Corticosteroid agents), Blood pressure, Sensitivity, Atropine, Ergot alkaloids, Females, Rats, Great Britain

The effects of single doses of DOCA or cortisone, with or without the addition of stilboestrol, on the vascular responses of anaesthetized female rats to vasopressin and oxytocin were studied. DOCA reduced the sensitivity to the pressor action of vasopressin in all animals. An initial fall in blood pressure always preceded the rise. After DOCA the majority of animals responsed to oxytocin with a small fall and then a rise in blood pressure. Cortisone increased the reactivity to vasopressin in all dioestrous females; during oestrus (natural or stilboestrol-induced) cortisone like DOCA reduced the sensitivity to vasopressin. The rise in pressure was, except in the dioestrous females, preceded by a sharp fall. Most of the cortisone-treated animals responded to oxytocin by a rise usually preceded by a fall in blood pressure. In three females the blood pressure was unchanged after oxytocin, and in a few it fell with no subsequent rise. Animals showing a diphasic response to vasopressin and a pure depressor or a diphasic response to oxytocin were given dihydroergotamine (DHE) and atropine to see how far the responses depended on autonomic nervous activity. With few exceptions after DHE the depressor phase of the response was abolished and the pressor phase regularly potentiated. The main exceptions were cortisone-treated oestrous rats and three of the six females treated with cortisone and stilboestrol; in these DHE enhanced the depressor phase of the response to vasopressin and oxytocin, and atropine given later caused a further enhancement. (Author)

AD-632 655 Fld. 6/16
EDINBURGH UNIV (SCOTLAND) DEPT OF PHYSIOLOGY
THE VASCULAR RESPONSES OF MALE RATS TO THE POST-PITUITARY HORMONES AFTER TREATMENT WITH DEOXYCORTICOSTERONE ACETATE (DOCA) AND CORTISONE,
by L. H. Honore. 6 Jul 62, 9p. Contract AF 61 (052)-272,
Unclassified report

Availability: Published in Quarterly Journal of Experimental Physiology v47 p345-51 1962. Copies to DDC users only.

Descriptors: (*Blood vessels, *Pituitary hormones), (*Corticosterod agents, Blood vessels), Rats, Sensitivity, Autonomic nervous system, Stilbestrol, Great Britain

The vascular responses of anaesthetized male rats to the posterior pituitary hormones were studied approximately 24 hr. after the administration of DOCA and cortisone. DOCA decreased the vascular sensitivity to the pressor effect of vasopressin in seven, but increased it in three animals. In five animals a sharp fall preceded the rise in blood pressure. After DOCA, oxytocin gave rise to three types of response-pressor, depressor and diphasic, i.e. depressor-pressor. Cortisone increased vascular reactivity to vasopressin in ten rats but reduced it in four. In conjunction with stilboestrol, cortisone as in the females decreased the vascular sensitivity to vasopressin. The diphasic response was obtained in most animals. Dihydroergotamine (DHE) and atropine were given to those rats showing a diphasic response to VP and either a depressor or a diphasic response to oxytocin. DHE suppressed the depressor phase in all DOCA-treated and in most of the cortisone-treated rats. In some cortisone-treated animals, DHE enhanced the depressor phase and atropine given after the DHE further enhanced it. The results are discussed with regard to the autonomic nervous system and the previously reported effects of orchidectomy. (Author)

AD-631 840 See Fld. 5/10

AD-631 907 See Fld. 14/4

AD-631 918 See Fld. 6/12

AD-631 919 See Fld. 6/12

AD-631 920 See Fld. 6/12

AD-632 027 See Fld. 6/3

AD-632 113 See Fld. 6/15

AD-632 119 See Fld. 6/3

AD-632 142 See Fld. 6/5

AD-632 195 See Fld. 6/1

AD-632 200 See Fld. 6/13

AD-632 482 See Fld. 6/19

AD-632 483 See Fld. 6/19

AD-632 508 See Fld. 6/1

AD-632 544 See Fld. 6/4

AD-632 583 See Fld. 5/10

AD-632 629 See Fld. 5/10

AD-632 630 See Fld. 5/10

AD-632 631 See Fld. 5/10

AD-632 632 See Fld. 5/10

AD-632 652 See Fld. 6/1

6/18. RADIOBIOLOGY

AD-631 989 Fld. 6/18, 22/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
RADIATION MONITORING WITH NUCLEAR EMULSIONS ON PROJECT GEMINI. I. EXPERIMENTAL DESIGN AND EVALUATION PROCEDURES: PARTIAL RESULTS ON MISSIONS 4 AND 5.
Joint rept.,
by Hermann J. Schaefer, and Jeremiah J. Sullivan. 18 Feb 66, 16p. Rept. no. NAMI-955, NAVMED MF0-22.03.02-5001.33
Unclassified report

Prepared in cooperation with National Aeronautics and Space Administration, Houston, Texas.

Descriptors: (*Space flight, *Radiation hazards), (*Radiation monitors, Space flight), (*Protons, Radiation hazards), Cosmic rays, Space environmental conditions, Astronauts, Radiological dosage, Dosimeters, Radiobiology, Space medicine

On Gemini 4 and 5, small packs of nuclear emulsions combined with other radiation sensors to flat pliable units were worn by the astronauts inside their space suits. Track and grain counting of 200 micra Ilford G.5 and K.2 emulsion pairs in the packs furnished the particle and energy spectrum of the radiation incident upon the astronaut's body. Evaluation of flux and energy spectrum in terms of millirad dose showed that the bulk of the exposure was due to trapped protons picked up in the South Atlantic Anomaly. The energy spectrum of the proton flux within the ship on the body of the astronaut is a continuum extending from zero to about 300 Mev, with a broad, well -developed maximum in the 30 to 40 Mev region. Because of the large fractional flux of low energy particles, the radiation level sensitively depends on local shield geometry producing variations of dose rate at different locations in the capsule of at least 60 per cent. Representative total doses were 48 millirads on Gemini 4 and 105 millirads on Gemini 5. (Author)

AD-632 049 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
59FE INCORPORATION INTO SPLEEN AND BONE MARROW OF INTACT AND SPLENECTOMISED X-IRRADIATED MICE RESTORED WITH SPLEEN COLONY CELLS,
by Raymond Schofield, and Leonard J. Cole. 11 Mar 66, 15p. Rept. no. USNRDL-TR-989, NAVMED MR005.08-1200-2
Unclassified report

Descriptors: (*Radiation effects, *Radiotherapy), Hemopoietic system, Blood cells, Spleen, Anemias, Mice, X-rays, Bone marrow, Iron

Cells from haemopoietic tissues when injected into lethally-irradiated mice induce survival and restoration of the animals, whether they are intact or splenectomised. But cells derived from haemopoietic nodules (which occur in spleens of heavily irradiated mice injected with bone marrow cells) when injected into lethally irradiated mice result in different effects in intact mice than in splenectomised ones. In the former the anaemia resulting

from irradiation is corrected within 25 days, whereas in splenectomised mice the anaemia which develops is much more severe and persists for up to 80 days after irradiation. The course of cellular repopulation of bone marrow in splenectomised mice irradiated with 900 rad and injected with spleen-nodule cells has been compared with that in intact mice treated in the same way. No differences were seen, indicating that the absence of the spleen did not have an effect on the repopulation. In order to assess the erythropoietic activity of total body bone marrow, to enable this to be compared with the erythropoietic activity of spleen, determination of Fe59 in whole cleaned mouse skeletons was carried out. The results show that in the mouse the two femora account for 13-15% of the total skeletal content of Fe59 at 5 hours after injection of the label. (Author)

AD-632 282 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
DIFFERENTIAL SENSITIVITY OF CIRCULATING AND PERITONEAL MONONUCLEAR CELLS OF MICE TO TOTAL-BODY X IRRADIATION,
by Lottie Kornfeld, and Vivian Greenman. 13 May 66, 18p. Rept. no. USNRDL-TR-999, Proj. DA-3A-014501-A71-H, NAVMED MR005.08-1200-4
Unclassified report

Descriptors: (*Lymphocytes, *Radiation effects), Leukocytes, X rays, Peritoneum, Whole body irradiation, Phagocytes, Sensitivity, Mice

Dose-response curves obtained 1 and 3 days after exposure to total-body X irradiation indicate that the mononuclear cells in the circulating blood and in the peritoneal cavity of LAF sub1 mice may be arranged in the following order of decreasing sensitivity: circulating lymphocytes, small peritoneal lymphocytes, medium peritoneal lymphocytes, peritoneal macrophages. However, on the 3rd day postirradiation, the curve of the small peritoneal lymphocytes closely approached that of the circulating lymphocytes. It is suggested that the greater sensitivity to irradiation of small than of medium peritoneal lymphocytes is not due to environmental factors but to as yet unidentified differences in the cells. On the other hand, the greater loss of circulating lymphocytes than of small peritoneal lymphocytes 1 day after X ray exposure may merely reflect more efficient removal of damaged cells from the circulation than from the peritoneal cavity. (Author)

AD-632 304 Fld. 6/18, 6/5
CFSTI Prices: HC $1.10 MF $0.50
UPPSALA UNIV (SWEDEN)
STUDY ON LOCALIZED RADIOLESIONS IN THE CENTRAL NERVOUS SYSTEM.
Technical rept.,
by The Svedberg. 30 Aug 62, 3p. Contract AF 61 (052)-183, AFOSR 4326
Unclassified report

Descriptors: (*Central nervous system, *Radiation effects), Pathology, Thalamus, Pituitary gland, Brain, Peripheral nervous system, Radiological dosage, Protons, Pigeons, Goats, Temperature, Ingestion (Physiology), Histology, Morphology (Biology), Cancer, Therapy, Surgery, Bibliographies, Sweden

AD-632 360 Fld. 6/18, 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY NATICK LABS MASS FOOD DIV
CALCULATED INTERNAL RADIATION DOSE FROM INGESTION OF MEAT STERILIZED BY ELECTRON IRRADIATION.
Technical rept.,
by Thomas G. Martin,III.. Apr 66, 22p. Rept. no. FD-38, Proj. DA-1-C-O-25601-A-033, USA-NLABS TR-66-26-FD
Unclassified report

Descriptors: (*Meat, Irradiated foods), (*Irradiated foods, Ingestion (Physiology)), (*Radiological dosage, Irradiated foods), Radiation effects, Dose rate, Equations, Beef, Electrons, Storage

The production of radionuclides in food irradiated with high energy electrons can be predicted reasonably well with the equation presented by R. A. Meyer. Using this equation and others derived from the reports of the International Commission on Radiological Protection it is possible to estimate the amount of radiation received by humans consuming meat irradiated by high energy electrons. The estimated annual internal doses decrease with storage time. At the maximum energy treated the dose would decrease from a maximum of 2.36 mrem/year to a minimum of 0.113 mrem/year with a storage time of 7 days and two years, respectively. The calculated values represented approximately 0.1 to 2% of the average mean radiation exposure of humans, 130 mrem/year due to natural environmental radiation. (Author)

AD-632 540 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
EFFECTS OF IRRADIATION ON BONE GROWTH OF RATS DURING PROTRACTED PARABIOSIS.
by Harold W. Carroll, Richard D. Phillips, and Donald J. Kimeldorf. 5 Apr 66, 14p. Rept. no. USNRDL-TR-1004, NAVMED MR005.08-5201-2
Unclassified report

Descriptors: (*Radiation effects, *Bone), (*Parabiosis, Radiation effects), Growth, Shielding, Hormones, X rays, Rats

The effects of x-irradiation on bone growth were studied in pairs of rats during protracted parabiosis involving vascular anastomosis. The preparation was used to define some potential mechanisms through which systemic factors contribute to growth retardation. No demonstrable deleterious effect of irradiation of one partner was sustained by the shielded partner in terms of bone growth. On the other hand, direct evidence was obtained to show that the bone growth deficit observed in the irradiated rat at 60 days postirradiation was reduced by shielding its parabion partner. The findings are consistent with the concept that the systemic effect on bone growth is a result of hormonal imbalance rather than the consequence of toxic factors produced by irradiation. (Author)

AD-631 905 See Fld. 6/5

6/19. STRESS PHYSIOLOGY

AD-631 880 Fld. 6/19
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
BODY SUSCEPTIBILITY TO HIGH ACCELERATIONS AND TO ZERO GRAVITY CONDITION,
by R. Margaria, and T. Gualtierotii. 1959, 23p. Contract AF 61 (052)-23, AFOSR 2014
Unclassified report

Availability: Published in Advances in Aeronautical Sciences v3-4 p1081-1103 1961. Copies to DDC users only.

Descriptors: (*Weightlessness, Tolerances (Physiology)), (*Acceleration tolerance, Aviation medicine), Gravity, Stress (Physiology), Body, Sense organs, Stimulation, Italy

AD-631 953 Fld. 6/19, 6/5
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN
BLOOD CLOTTING STUDIES IN A SUBMARINE CREW.
Interim rept.,
by Ganson Purcell,Jr.. 26 Jul 65, 10p. Rept. no. 468, NAVMED MF022.03.03-9025.21
Unclassified report

Availability: Published in Archives of Environmental Health v11 p804-9 Dec 1965. Copies to DDC users only.

Descriptors: (*Blood coagulation, *Submarine personnel), Blood platelets, Prothrombin, Fibrinogen, Hemorrhage, Vitamin K, Blood analysis, Etiology, Pathology, Tests, Military medicine, Surgery, Medical examination, Diagnosis

A battery of five tests was employed to analyze the several phases of the blood clotting mechanism in ten normal volunteer subjects in serial fashion throughout a Polaris submarine patrol cycle. Results of all tests remained well within accepted normal limits throughout the pre-patrol and patrol segments of the testing period. Etiologies of acquired coagulation defects are discussed briefly; precautions to avoid such developments are presented, and reparative measures in the iatrogenically induced coagulopathies are outlined. Proposal is made that a simple platelet screening test, the prothrombin time, and partial thromboplastin time provide a means of anticipating the development of hemorrhagic diathesis postoperatively, should surgery aboard the nuclear submarine become a necessity. (Author)

AD-632 252 Fld. 6/19
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
MEDICAL PROBLEMS OF WEIGHTLESSNESS,
by Perry B. Miller. Oct 65, 10p. Rept. no. SAM-TR-66-200, Proj. AF-7755,
Unclassified report

Prepared for presentation at the Session of the Texas Medical Association (98th annual), May 1, 1965.

Availability: Published in Texas State Journal of Medicine v61 p720-4 Oct 1965. Copies to DDC users only.

Descriptors: (*Space medicine, Weightlessness), (*Weightlessness, Stress (Physiology)), Tolerances (Physiology), Cardiovascular system, Blood volume, Space flight, Exercise, Relaxation (Physiology), Muscles, Calcium, Excretion, Urine, Posture, Body fluids, Pressure suits

The similarity between prolonged space flight and prolonged bed rest suggests that the adverse physiologic effects of bed rest may also develop during space flight. A decrease in exercise tolerance, orthostatic tolerance, muscle strength, and blood volume and an increase in urinary calcium excretion occur during prolonged bed rest. Orthostatic intolerance has been reported after American and Soviet space flights. The preservation of normal postural tolerance may require some method of simulating hydrostatic effects of gravity on the body fluids, in addition to physical exercise. Intermittent lower body negative pressure, which provokes cardiovascular responses similar to those of standing, shows promise of maintaining postural tolerance. Until in-flight methods to protect orthostatic tolerance are perfected, the wearing of an antigravity suit should prevent postural fainting after landing from a prolonged space flight. To maintain circulatory and physical endurance, vigorous exercise similar to that performed on a bicycle appears necessary. Isometric exercise should be adequate for maintaining muscle strength. No method to prevent osteoporosis and its attendant hypercalciuria has been discovered. (Author)

AD-632 253 Fld. 6/19
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
EFFECTS OF MODERATE PHYSICAL EXERCISE DURING FOUR WEEKS OF BED REST ON CIRCULATORY FUNCTIONS IN MAN,
by Perry B. Miller, Robert L. Johnson, and Lawrence E. Lamb. Nov 65, 10p. Rept. no. SAM-TR-65-263,
Proj. AF-7755,
Unclassified report

Availability: Published in Aerospace Medicine v36 n11 p1077-82 Nov 1965. Copies to DDC users only.

Descriptors: (*Space medicine, Exercise), (*Exercise, Blood circulation), Cardiovascular system, Relaxation (Physiology), Blood volume, Erythrocytes, Pulse rate, Posture, Tolerances (Physiology), Stress (Physiology), Pressure suits, Weightlessness

Various effects on circulatory functions of light to moderate physical exercise during 4 weeks of bed rest were studied on 6 subjects. During exercise narrow cuffs inflated to 60 mm. Hg were worn on the upper thighs. Changes in plasma volume during and after bed rest paralleled those characteristic of simple bed rest. In contrast to simple bed rest, the major loss of red cell mass was noted at the end of bed rest and not during ambulation following bed rest. The mean resting heart rate for all subjects increased 15 beats per minute during bed rest. The degree of postural intolerance after bed rest appeared as marked as that observed after absolute bed rest. Physical endurance on the treadmill was decreased after bed rest. (Author)

AD-632 482 Fld. 6/19, 6/16
CFSTI Prices: HC $1.00 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
THE EFFECT OF GAS DENSITY ON THE WORK OF BREATHING IN MAN.
Final rept., Jan 64-Feb 65,
by Domenic A. Maio. Mar 66, 18p. Rept. no. SAM-TR-66-22,
Task 775802,
Unclassified report

Descriptors: (*Space medicine, Respiration), (*Respiration, Measurement), Pressure breathing, Adaptation (Physiology), Altitude, Barometric pressure, Gases, Meters, Density, Spacecraft cabins, Space environmental conditions

The effect of gas density on the work of breathing was studied in 3 normal male subjects. Gas density was varied by decreasing the barometric pressure in an altitude chamber, as well as by varying the percentage of oxygen with nitrogen and helium. Three frequencies of breathing were selected at 8, 16, and 24 breaths per minute to cover the resting physiologic range, with tidal volume adjusted to allow an alveolar ventilation of 6 liters per minute. There appeared to be a slight decrease in the total work of breathing at the lower gas densities, owing to a decrease in the nonelastic work of breathing. The elastic work was not influenced by gas density but did decrease with increasing breathing frequency. The non -elastic work likewise was affected by frequency, decreasing at the lower breathing frequencies. The order of magnitude of these changes, however, would probably not be of any practical significance and thus would not be a factor in the preferential selection of a particular gas mixture - cabin pressure combination for a manned space vehicular environment. (Author)

AD-632 483 Fld. 6/19, 6/16
CFSTI Prices: HC $3.00 MF $0.50
SYSTEMS RESEARCH LABS INC DAYTON OHIO
FREQUENCY ANALYSIS OF KOROTKOV BLOOD PRESSURE SOUNDS USING THE FOURIER TRANSFORM.
Final rept.,
by Thomas Rauterkus, John F. Feltz, and Jay W. Fickes. Feb 66, 53p. Contract AF 41 (609)-2753, Task 793003,
SAM TR-66-8
Unclassified report

Descriptors: (*Blood pressure, Measurement), (*Sound signals, Blood pressure), Monitors, Recording systems, Telemeter systems, Audiofrequency, Signal -to-noise ratio, Integral transforms, Digital computers, Oscilloscopes, Photographs, Stress (Physiology)

The purpose of this investigation was to determine the frequency content of the sound signals (Korotkov sounds) obtained from the microphone located in the arm cuff of an automatic blood pressure measuring instrument. Korotkov sound recordings were made for five subjects in five experimental situations: rest, postexercise, passive tilting, centrifuge rides, and flights in NF-100 aircraft. The frequency analysis was performed by using a digital computer to obtain the Fourier transforms of the sound signals. The Fourier transforms were displayed on the computer oscilloscope and photographed. The photographs were then arranged in a number of rectangular arrays for convenient comparison of the frequency content of the Korotkov sounds as related to the several types of Korotkov sounds, experimental situations, and subjects. Initial study of the 240 average Fourier transforms contained in these arrays indicates no readily observable common characteristics except that most of the sound energy is almost always located below 50 cps. (Author)

AD-632 549 Fld. 6/19
NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C
PLASMA AND SWEAT HISTAMINE CONCENTRATIONS AFTER HEAT EXPOSURE AND PHYSICAL EXERCISE.
Interim rept.,
by John W. Garden. 14 Jun 65, 9p. Rept. no. vol. 16/No. 14,
NAVMED MF022.03.04-8002.5
Unclassified report

Availability: Published in Journal of Applied Physiology v21 n2 p631-5 Mar 1966. Copies to DDC users only.

Descriptors: (*Histamine, Excretion), (*Exercise, Heat tolerance), (*Heat tolerance, Histamine), Blood plasma, Perspiration, Sweat cooling, Stress (Physiology), Cardiovascular system, Peptides

Plasma and sweat histamine concentrations were determined in a group of healthy adult males before and after a period of daily walking on a motor-driven treadmill under hot environmental conditions. A comparison of the values before and after exercise during 10 days of repeated heat exposure was made. Plasma histamine concentrations were also determined on groups of comparable subjects before and after walking on the treadmill in a cool environment, exercises on the Universal Gym (a training device designed for muscular development), and a 600-yard run. Plasma histamine concentration was found to increase significantly during exercise in hot environmental conditions and the daily increase becomes significantly less after 10 days. No changes were noted in the total sweat histamine excretion during heat exposure or the plasma histamine concentrations under the other conditions of physical exercise studied. The significance of these findings to the role of histamine in cardiovascular regulation is discussed. (Author)

AD-632 567 Fld. 6/19
CFSTI Prices: HC $2.60 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) LABS OF AVIATION AND NAVAL MEDICINE
HYPOXEMIA IN MAN INDUCED BY PROLONGED ACCELERATION.
Annual summary technical rept.,
by P. O. Barr. 30 Jul 61, 16p. Contract AF 61 (052)-153,
Unclassified report

Descriptors: (*Hypoxia, Acceleration), Aviation medicine, Acceleration tolerance, Oxygen, High altitude, Pressure suits, Respiration, Blood, Lungs, Sweden

Changes in the arterial oxygen saturation were recorded in healthy subjects on the human centrifuge by continuous cuvette oximetry before, during and after prolonged exposures to positive acceleration. With the subjects breathing air and wearing an automatically inflated anti-g suit, an immediate fall in the arterial O2 saturation was observed upon exposure to 4.5 - 5.0 g. After one minute of the first exposure the O2 saturation ranged between 95 and 81 per cent, the arterial pH remaining essentially unchanged. At the same time the respiratory minute volume had increased, indicating gross deterioration in the efficiency of pulmonary function. Repeated exposures caused the arterial O2 saturation to fall at a faster rate and to a lower level with each consecutive run. The rate of resaturation on returning to normal gravity was usually slow, and markedly so after several exposures. The last-mentioned observations are interpreted as being mainly the result of residual atelectasis in dependent regions of the lungs. The potential dangers of acceleration-induced hypoxemia in high performance flight missions are discussed. (Author)

AD-632 601 Fld. 6/19, 5/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
MODIFICATION OF VESTIBULAR RESPONSES AS A FUNCTION OF RATE OF ROTATION ABOUT AN EARTH-HORIZONTAL AXIS,
by Manning J. Correia, and Fred E. Guedry Jr..
24 Mar 66, 18p. Rept. no. NAMI-957,
Contract NASA Order-R-93,
NAVMED MR005.13-6001.1.129
Unclassified report

Descriptors: (*Nystagmus, Rotation), (*Stress (Physiology), Nystagmus), Gravity, Acceleration tolerance, Proprioception, Vestibular apparatus, Motion sickness

A study was made to compare nystagmic and subjective responses elicited at 10 RPM with responses elicited at 30 RPM when the axis of rotation was horizontal. When the same subjects were rotated about an Earth -horizontal axis at 10 and 30 RPM, the following differences in responses were noted: (1) Subjects who produced a unidirectional horizontal nystagmus throughout rotation at 10 RPM produced a reversing horizontal nystagmus after an interval (30 - 60 seconds) of rotation at 30 RPM. (2) Subjects, who gave veridical estimates of body orientation at 10 RPM, became disoriented at 30 RPM when nystagmus commenced reversing. At both 10 and 30 RPM a cyclic modulation of nystagmus was related to orientation relative to gravity. As in previous studies, sickness was produced by rotation about a horizontal axis, and a relationship between mental task and incidence of sickness was again noted. (Author)

AD-632 627 Fld. 6/19
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) LABS OF AVIATION AND NAVAL MEDICINE
PULMONARY GAS EXCHANGE IN MAN AS AFFECTED BY PROLONGED GRAVITATIONAL STRESS.
Final rept.,
by Per-Olof Barr. 1963, 44p. Contract AF 61 (052)-153,
Unclassified report

Availability: Published in Acta Physiologica Scandinavica v58 suppl 207 p5-45 1963. Copies to DDC users only.

Descriptors: (*Acceleration tolerance, *Respiration), Stress (Physiology), Gravity (Artificial), Pressure suits, Lungs, Blood, Blood vessels, Hypoxia, Carbon dioxide, Oxygen, Barometric pressure, Hyperventilation, Performance (Human), pH, Sweden

Due to the increased effective weight of the blood during acceleration, downward displacement of blood occurred in the pulmonary and systemic circuits with concomitant reduction of total flow. In consequence, the equivalent of one third of the total number of alveoli was completely deprived of blood flow; the alveolar ventilation of a corresponding portion of the lungs, being in effect a dead-space ventilation, produced a large arterial to end-tidal CO2 difference. In the lower parts of the lungs congestion caused a large shunt (one-fifth of cardiac output), which is mainly ascribed to low V/Q ratios but also to impaired transmembrane gas diffusion. This shunt is regarded as the main cause of the large alveolar to arterial O2 difference, with a consequent severe arterial hypoxemia in spite of relative alveolar hyperventilation. A commentary is given on some applications of the result to problems of human performance under prolonged headward acceleration.

AD-631 925 **See Fld. 6/20**

AD-632 457 **See Fld. 6/12**

AD-632 571 **See Fld. 5/10**

6/20. TOXICOLOGY

AD-631 922 Fld. 6/20
CFSTI Prices: HC $17.40 MF $1.00
DEUTSCHE FORSCHUNGSANSTALT FUER PSYCHIATRIE (MAX-PLANCK-INSTITUT) MUNICH (WEST GERMANY)
TOXICITY CHANGES IN THE CENTRAL NERVOUS SYSTEM. OXYGEN DEFICIENCY AND ITS INFLUENCE ON THE CENTRAL NERVOUS SYSTEM.
Final technical rept.,
by W. Scholz, J. W. Boellaard, and H. Hager. 15 May 59, 178p. Contract AF 61 (514)-945,
Unclassified report

Descriptors: (*Hypoxia, *Central nervous system), Toxicity, Brain, Ganglia, Histology, Morphology (Biology), Oxygen, Nerve cells, West Germany

Contents: The morphologic pattern of oxygen deficiency in the human brain, and Electronoptic studies on the earliest structural changes of the brain caused by hypoxidosis.

AD-631 925 Fld. 6/20, 6/19
CFSTI Prices: HC $1.00 MF $0.50
INDIANA UNIV MEDICAL CENTER INDIANAPOLIS DEPT OF NEUROLOGY
OXYGEN CONVULSIONS IN MAN,
by H. W. Gillen. 1966, 14p. Contract Nonr-969 (04) ,Nonr-4343 (00)
Unclassified report

To be pub. in Proceedings of International Conference on Hyperbaric Medicine (3rd), NAS/NRC, 1966.

Descriptors: (*Hyperventilation, Convulsive disorders), (*Convulsive disorders, Poisoning), Humans, Toxicity, Oxygen

Seventy examples of acute cerebral oxygen toxicity were described. Twenty-five had convulsions as the first clinical manifestation of the toxicity, ten had focal twitching, and thirteen more progressed to convulsions in spite of attempted immediate therapy. The convulsions were self-limited if the p02 was reduced to non-toxic pressures. The morbidity was minimal with retrograde amnesia as the only deficit that persisted beyond 24 hours. No deaths occurred in this series. Re-examination of the clinical data revealed only one instance where more careful pre-exposure selection may have prevented the convulsion. All exposures were at less than three atmospheres absolute, and all but four were for thirty minutes or less. (Author)

AD-632 296 Fld. 6/20
CFSTI Prices: HC $2.00 MF $0.50
ZURICH UNIV (SWITZERLAND) DEPT OF ANATOMY
ELECTRON MICROSCOPIC AND MORPHOMETRIC STUDY OF RATS EXPOSED TO 98.5 PERCENT OXYGEN AT ATMOSPHERIC PRESSURE.
Final rept., Feb 64-Jul 65,
by Gonzague S. Kistler, Peter R. B. Caldwell, and Ewald R. Weibel. Dec 65, 47p. Contract AF 61 (052)-784, Proj. AF-7164, Task 716404, AMRL TR-65-66
Unclassified report

Descriptors: (*Hyperventilation, Pathology), Rats, Electron microscopy, Morphology (Biology), Cardiovascular system, Blood cells, Switzerland, Oxygen, Lungs, Poisoning, Toxicity

Rats were exposed to 98.5% oxygen at 765 Torr in a controlled environmental chamber. Groups were sacrificed at 6, 24, 48, and 72 hours and the lungs were prepared for light and electron microscopic examination. A control group breathed room air. In the groups which breathed oxygen for 6 and 24 hours no changes in lung structure could be observed. After 48 hours the interstitial space was enlarged by accumulation of fluid and early destructive changes of the capillary endothelial lining were found. After 72 hours the widened interstitial space contained numerous leucocytes, thrombocytes and other cells; fibrin strands were numerous. There was marked destruction of the pulmonary capillaries. At this stage, 65% of all alveoli were filled with an exudate containing leucocytes, erythrocytes, macrophages and fibrin strands. There was a decrease in capillary blood volume and of endothelial surface after 72 hours. The thickness of the air-blood barrier was increased after 48 and doubled after 72 hours. The barrier thickening was mainly due to increase of the interstitial space; terminally, the epithelium was also thickened, although the endothelium became thinner, on the average, due to destruction. As a result of these alterations there was a marked fall in estimated gas exchange capacity of the air-blood tissue barrier. (Author)

AD-632 372 Fld. 6/20
CFSTI Prices: HC $1.00 MF $0.50
ROGOFF MEDICAL RESEARCH INST PETAH TIQWA (ISRAEL).
INVESTIGATIONS ON THE ANTIGENICITY OF SNAKE VENOMS.
Special technical rept. for 1 Oct-31 Dec 65,
by Natan Goldblum. 31 Dec 65, 3p. Contract DA-91-591-EUC-3789,
Unclassified report

Descriptors: (*Venoms, Toxins + antitoxins), (*Immune serums, Venoms), Reptiles, Antigens + antibodies, Toxicity, Equines, Immunity, Israel

AD-632 582 Fld. 6/20, 6/10
INDIANA UNIV MEDICAL CENTER INDIANAPOLIS
CARDIOPULMONARY EFFECTS OF SUBACUTE HYDRAZINE POISONING IN RHESUS MONKEYS,
by Ralph O. Hayden, and Raymond H. Murray. Dec 65, 11p. Contract AF 33 (606)-8378, Proj. AF-7222,
AMRL TR-65-236
Unclassified report

Availability: Published in Industrial Medicine and Surgery v34 n12 p925-33, Dec 1965. Copies to DDC users only.

Descriptors: (*Hydrazine, Toxicity), (*Cardiovascular system, Hydrazine), Poisoning, Pathology, Liver, Heart, Cannulation, Gas analysis, Biopsy, Hematology, Lungs, Blood pressure, Pulse rate, Oxygen consumption, Hemoglobin, Hematocrit, Dehydration, Metabolism, Industrial medicine, Monkeys

The cardiopulmonary effects of subacute hydrazine toxicity were studied in seven rhesus monkeys by right and left heart catheterization, expired gas analysis, and necropsy. Aortic, left ventricular, pulmonary capillary, pulmonary arterial, right ventricular, and right atrial pressures were measured as well as heart rate, cardiac and stroke index, systemic and pulmonary vascular resistance, tension-time index, systolic ejection period and rate index, left ventricular and stroke work index, minute respiratory volume and oxygen consumption index, hemoglobin, hematocrit, and arterial and venous mixed blood oxygen content and saturation before and after hydrazine administration. The dosed animals lost weight, and arterial blood pressure, cardiac and stroke index, systolic ejection period, tension-time index, left ventricular work index, oxygen consumption index, and arterial oxygen capacity decreased. Fatty myocardial alterations were present in six of the seven monkeys. These findings were attributed to dehydration and secondary metabolic disturbances, but a direct toxic action of hydrazine on the heart could not be excluded. (Author)

6/21. WEAPON EFFECTS

AD-632 595 Fld. 6/21, 15/4, 15/6
CFSTI Prices: HC $5.00 MF $1.00
BIO-DYNAMICS INC CAMBRIDGE MASS
REVIEW OF COMBINED TRAUMA: RESEARCH, CLINICAL MANAGEMENT AND PLANNING,
by Dean W. Williams, Benjamin C. Duggar, Edward J. Burger, and Harry S. Chamberlin. Jan 66, 174p. Contract OCD-OS-63-141,PH-86-64-134
Unclassified report

Descriptors: (*Nuclear warfare casualties, *Radiation injuries), Civil defense systems, Nuclear weapons, Burns, Radiation sickness, Radioactive fallout, Blast, Wounds + injuries, Infections, Antibiotics, Immunity, Medicine, Therapy, Shock (Pathology), Artificial respiration, Electrolytes (Physiology), Radiological dosage, Disasters, Survival, Medical personnel, Management planning, Bibliographies

The review covers the topic of combined trauma-radiation injury plus burns, physical injury, and/or infection. Since this class of casualty is almost exclusively the product of nuclear weapons effects, the emphasis of the review is on principles of clinical management. Major sections of the review are: (1) A casualty model, generated to assess the significance of combined trauma relative to other forms of injury. (2) A review of clinical management principles for care of combined trauma patients. (3) Clinical guides to the care of radiation, burn, and infection casualties. (4) A review of the recent combined trauma research, and (5) A summary of planning measures designed to assist in preparedness for disaster medical care. An extensive bibliography is also included. (Author)

Field 7-CHEMISTRY

7/1. CHEMICAL ENGINEERING

AD-631 929 **See Fld. 12/2**

7/2. INORGANIC CHEMISTRY

AD-631 987 Fld. 7/2, 20/2, 20/12, 11/2
CFSTI Prices: HC $1.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB

CRYSTAL CHEMISTRY STUDIES.
Quarterly rept. no. 3, 14 Nov 65-13 Feb 66,
by Rustum Roy, G. J. McCarthy, O. Muller, and W. B. White. Apr 66, 11p. Contract DA-28-043-AMC-01304 (E), Proj. DA-1C0-14501-B13A
ECOM 01304-3

Unclassified report

See also AD-627 468.

Descriptors: (*Crystals, Chemical properties), (*Rhenium compounds, Rare earths), (*Samarium compounds, Synthesis (Chemistry)), Crystal lattices, Ytterbium compounds, Erbium compounds, Dysprosium compounds, Neodymium compounds, Oxides, Silicates, X-ray diffraction analysis

Work was focused on the characterization of the rare-earth-rhenium compounds and a new compound of samarium. Precise unit cell data are reported for Yb2ReO5, Er2ReO5, and Dy2ReO5. Nd2ReO5 is polymorphic and cell data for both forms are reported. The results of a large sequence of experiments are reported in which compound formation was sought between ReO2 and MgO, CdO, Sb2O3, Al2O3, Cr2O3, and Fe2O3. The samarium compound tentatively identified as Sm3O4 is now thought to be a silicate 2 Sm2O3.SiO2. (Author)

AD-632 065 Fld. 7/2, 7/3
HYNES CHEMICAL RESEARCH CORP DURHAM N C
THE ADDITION OF CHLORINE MONOFLUORIDE TO FLUORINATED NITRILES,
by John B. Hynes, and Thomas E. Austin. 12 Oct 65, 2p. Contract DA-31-124-ARO (D)-46, AROD 3802:6

Unclassified report

Availability: Published in Inorganic Chemistry v5 n3 p488-9 Mar 1966. Copies to DDC users only.

Descriptors: (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Nitriles, Fluorination), (*Fluorine compounds, Synthesis (Chemistry)), Chlorine compounds, Chemical reactions, Pyrolysis, N-heterocyclic compounds, Amines

A general synthesis is reported for fluorinated aliphatic dichloramines which involves the low-temperature addition of chlorine monofluoride to fluorinated nitriles. Using this technique, C2F5NCl2, C3F7NCl2, ClCIF2CF2NCl2, and NCl2CF2CF2CF2NCl2 were prepared in 65 to 75% yield with only a very small percentage of by-product formation accompanying the reactions. The generalized equation for this transformation is RCN + 2ClF to RCF2NCl2. Although these compounds rapidly oxidize aqueous potassium iodide solutions, they were found not to be appreciably impact sensitive. Studies were made to elucidate the mechanism of the reaction. The thermal decomposition of the fluorinated dichloramines proceeded cleanly in the neighborhood of 200C producing chlorine and a symmetrical azo compound in high yield. In addition to providing further structural corroboration for the new dichloramines, this pyrolytic reaction provides a convenient route to otherwise difficulty accessible azo compounds and a potential route to new unsymmetrical and cyclic systems. (Extracted)

AD-632 224 Fld. 7/2, 7/4
RIAS INC BALTIMORE MD
MOLECULAR ORBITALS OF DIBORANE IN TERMS OF A GAUSSIAN BASIS,
by LouisBurnelle. 21 Jul 65, 8p. Contract AF 49(638)-1220, Proj. AF-9750, Task 975001, AFOSR 66-0360

Unclassified report

Availability: Published in Journal of Chemical Physics v43 n10 p3540-5 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Diboranes, *Molecular orbitals), Electrons, Integrals, Boron, Hydrogen, Molecular energy levels, Statistical distributions, Chemical bonds, Quantum statistics

The molecular orbitals of diborane were calculated by the nonempirical SCF-LCAO method, taking all electrons of the molecule into account and calculating exactly all the integrals. The basis functions were Gaussians centered on the various atoms of the molecule. Two sets of Gaussians were used, the largest one containing 54 functions, distributed as follows: 9s + 3p on each boron, and 3s on each hydrogen. The ordering of the molecular orbitals on the energy scale agrees with that found by Newton, Boer, Palke, and Lipscomb who have used an almost optimized minimal STO basis. The calculated total molecular energy, -52.753 a.u., is 0.468 a.u. higher than the experimental value. A value of 12.9 eV is obtained for the ionization potential, which is to be compared with experimental results ranging from 11.9 to 12.1 eV. An electron-population analysis indicates the presence of very small gross atomic charges (qB = 0.088e; qH (bridge)=-0.002e; qH (terminal)=0.045e). The overlap populations are as follows: n (B, B)=0.064; n (B, H (term))= 0.880; n (B,H (bridge))=0.345. These suggest a structure involving practically no bond between the borons, the bonding in the central part of the system being mainly concentrated in three-center banana bonds. (Author)

AD-632 227 Fld. 7/2
AEROCHEM RESEARCH LABS INC PRINCETON N J
HIGH TEMPERATURE OXIDATION OF CARBON BY ATOMIC OXYGEN,
by Daniel E. Rosner, and H. Donald Allendorf. 26 Mar 65, 6p. Contract AF 49 (638)-1195, Proj. 9750, Task 975001, AFOSR 66-0350

Unclassified report

Availability: Published in Carbon v3 p153-6 1965. Copies to DDC users only.

Descriptors: (*Graphite, Oxidation), (*Carbon, Oxidation), High-temperature research, Reaction kinetics, Oxygen, Surfaces, Pressure, Probability

The true kinetics of the attack of high temperature graphite by both atomic and diatomic oxygen have been studied using microwave discharge-fast flow system techniques. In the surface temperature range 1100K -2000K the oxidation probability for O-atom attack (i) exceeds that for O2 by factors between 5 and as much as 80, (ii) passes through a maximum in this temperature range, as does the O2 attack probability on the same surface, and (iii) is independent of oxygen partial pressure (corresponding to a first order reaction), in contrast to the kinetic order of the O2/carbon reaction. Several mechanistic implications of these results are briefly discussed. (Author)

AD-632 249 Fld. 7/2
PURDUE UNIV LAFAYETTE IND DEPT OF CHEMISTRY
MULTIDENTATE LIGAND KINETICS. VIII. THE EFFECT OF HYDROXIDE, ACETATE, AND AZIDE COMPLEXES OF COPPER (II) IN ITS REACTION WITH ETHYLENEDIAMINE TETRAACETATE COMPLEXES,
by Dale W. Margerum, B. A. Zabin, and D. L. Janes. 2 Aug 65, 8p. Contract AF 49 (638)-60,NSF-G22566 Proj. AF-9763, Task 976301 AFOSR 66-0684

Unclassified report

Availability: Published in Inorganic Chemistry, v5 n2 p250-5 February 1966.

Descriptors: (*Complex compounds, Reaction kinetics), (*Copper compounds, Complex compounds), (*Ethylenedinitrilo tetraacetates, Reaction kinetics), Hydroxides, Acetates, Azides, Zinc compounds, Nickelates, Exchange reactions, pH

The kinetics of the reaction of copper (II) with the ethylenediamine tetraacetatozincate (II) and -nickelate (II) complexes are studied in the presence of various anions at 25.0C and an ionic strength of 0.10. From pH 5 to 7, the rate of the exchange reaction of Cu (+2) with Zn-EDTA increased about 10-fold with increase in pH. This is attributed to the reaction of hydroxocopper (II). On the other hand, the azide and acetate ion complexes of Cu (II) reduce the rate of the exchange reaction with Zn-EDTA. The rate of reaction of Cu (II) with Ni-EDTA also is accelerated above pH 5 and the effect is attributed to CuOH (+). Thus, in EDTA exchange reactions the kinetic reactivity is CuOH (+)>>Cu (+2)>CuAc (+), CuN3 (+). (Author)

AD-632 418 Fld. 7/2, 7/3
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
A NUCLEAR MAGNETIC RESONANCE STUDY OF HYDROGEN BONDING IN TRIS (2-N-METHYLAMINOETHYL) BORATE AND SIMILAR COMPOUNDS,
by Devon W. Meek, and Charles S. Springer,Jr.. 26 Oct 65, 6p. Contract DA-ARO (D)31-124-G500
AROD 4486:4

Unclassified report

Availability: Published in Inorganic uchemistry, v5 p445-50 1966. Copies to DDC users only.

Descriptors: (*Borates, *Nuclear magnetic resonance), (*Molecular association, Borates), Amines, Organoboranes, Esters, Chemical bonds, Hydrogen, Absorption spectrum, Solvents, Complex compounds, Exchange reactions, Catalysis

Tris (2-aminoethyl) borate, B (OCH2CH2NH2)3, and the analogous N-methylamino and N,N-dimethylamino compounds were prepared by the transesterification of methyl borate with the appropriate 2-aminoethanol. The nuclear magnetic resonance spectra show that extensive association of the terminal amino groups occurs in pure tris (N-methylaminoethyl) borate and that this association can be broken apart by heating to 160C or by dissolution in polar organic solvents such as triethylamine or acetonitrile. In order to determine whether the association results from hydrogen bonding or internal B-N coordination, several model systems wele investigated. The spectra of NH2C2H5.BF3, piperidine .BF3, and (C6H5)2BOCH2CH2NH2 in acetonitrile contain very complicated NCH2 peaks and broad NH peaks which appear at low applied magnetic field. The broadening of the NH peak in the boron-nitrogen adducts is attributed to the effect of the N14 quadrupole, whereas the complex splitting of the NCH2 multiplet is attributed to coupling with B11 in the dative bond with nitrogen and possibly with the nitrogen protons. (Author)

AD-632 448 Fld. 7/2, 7/3
NEWCASTLE-UPON-TYNE UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY
DERIVATIVES OF CYCLOTETRAZENOBORANE (BORATETRAZOLE), N4H2BH,
5 Apr 65, 4p. Contract AF-EOAR-79-64, AFOSR 66-0312

Unclassified report

Availability: Published in Journal of the Chemical Society v1156 p6205-9 Nov 1965. Copies to ddc users only.

Descriptors: (*Boranes, Chemical reactions), (*N-heterocyclic compounds, Boranes), Azides, Decaboranes, Organic nitrogen compounds, Molecular structure, Spectroscopy, Great Britain

A new five-membered ring system containing one boron and four nitrogen atoms was synthesised by the reaction of phenyl azide with either decaborane or aniline-borane. The structure of 2,5-diphenyl cyclotetrazenoborane, Ph2N4BH, was established and its spectroscopic and other properties investigated. (Author)

AD-632 451 Fld. 7/2
BIRMINGHAM UNIV (ENGLAND) DEPT OF CHEMISTRY
PENTAFLUOROSULPHUR IMINOSULPHUR DIFLUORIDE,
by B. Cohen, T. R. Hooper, and R. D. Peacock. 11 Oct 65, 3p. Proj. AF-9710, Task 971002, AFOSR 66-0683
Unclassified report

Availability: Published in Chemical communications p32 1966. Copies to DDC users only.

Descriptors: (*Fluorine compounds, Synthesis (Chemistry)), (*Sulfur compounds, Synthesis (Chemistry)), (*Nitrogen compounds, Synthesis (Chemistry)), Fluorine, Nitrides, Imines, Great Britain

Fluorine diluted with N2 passed over tetrasulful tetranitride, S4N4, at 0C forms a mixture of SF6, SF4, NF3, N2F2 thiazyl fluoride NSF and a new compound, pentafluoro sulfuriminosulfur-difluoride, SF6-N=SF2 which was characterized by the usual methods. (Author)

AD-632 063 See Fld. 7/5

AD-632 064 See Fld. 7/4

AD-632 215 See Fld. 7/3

AD-632 216 See Fld. 7/3

AD-632 217 See Fld. 7/3

AD-632 283 See Fld. 7/5

AD-632 333 See Fld. 20/6

AD-632 370 See Fld. 7/4

AD-632 429 See Fld. 20/13

AD-632 463 See Fld. 7/5

AD-632 464 See Fld. 7/3

AD-632 651 See Fld. 7/4

7/3. ORGANIC CHEMISTRY

AD-631 835 Fld. 7/3, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GAS-CHROMATOGRAPHIC ANALYSIS OF ORGANIC COMPOUNDS,
by Lin Tieh-tsen. 15 Mar 66, 24p. Rept. no. FTD-TT-65-684, TT 66-61128
Unclassified report

Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n2 p1-7 1964.

Descriptors: (*Organic compounds, Gas chromatography), (*Gas chromatography, Reviews), Quantitative analysis, Combustion products, Carbon, Hydrogen, Nitrogen, Sulfur, Oxygen, Laboratory equipment, Combustion, Oxidizers, Errors, China

The applications of gas chromatography in organic analysis, especially of combustion products, is reviewed. Topics include: Quantitative analysis of organic compounds by gas chromatography (simultaneous determination of C and H, two methods of determining N, two methods of determining S, determination of O, simultaneous determination of several elements); basic studies on application of gas-chromatography to analysis of compounds (combustion of samples, judging the capabilities of oxidizing agents, rinsing of combustion products); sources of errors.

AD-632 001 Fld. 7/3, 7/4
CFSTI Prices: HC $1.00 MF $0.50
FRICK CHEMICAL LAB PRINCETON UNIV NJ
FAR INFRARED STUDIES OF HYDROGEN BONDING.
Technical rept.,
by William J. Hurley, Irwin D. Kuntz,Jr., and George E. Leroi. Mar 66, 19p. Rept. no. TR-5, Contract Nonr-1858 (48), Proj. NR-051-466,
Unclassified report

Submitted for publication in the Journal of the American Chemical Society.

Descriptors: (*Molecular association, *Infrared spectroscopy), Hydrogen, Chemical bonds, Phenols, Chlorine compounds, Absorption spectrum, Raman spectroscopy, Band spectrum

Direct spectroscopic observations of the hydrogen bond stretching frequencies in the pure cresols and chlorophenols were obtained in the far infrared. Previous difficulties in making assignments were obviated by the use of the following criteria, which provide unambiguous identification of the stretching frequency: (1) disappearance of the absorption when -OCH3 is substituted for -0H; (2) absence of the band in the Raman spectrum; (3) observation of a broad asymmetric band contour. Although no generalizations may yet be drawn, there is no simple correlation between hydrogen bond streching frequency and near infrared bonded 0-H frequency shifts for these compounds. The stretching frequency of the intramolecular H-bond in o-chlorophenol is lower than those of the intermolecular hydrogen bonds in the other examples. (Author)

AD-632 053 Fld. 7/3, 6/1, 7/4
PENNSYLVANIA UNIV PHILADELPHIA
VAPOR SPECTRA OF PORPHYRINS,
by John A. Mullins, Alan D. Adler, and Robin M. Hochstrasser. 28 Jun 65, 2p. Contract DA-31-124-ARO (D)-101,SD-69
AROD 4278:3
Unclassified report

Availability: Published in Reprint. Copies to DDC users only.

Descriptors: (*Porphrins, Band spectra), Vapors, Absorption spectrum, Complex compounds, Copper compounds, Molecular association, Solvents, Heat of sublimation

The vapor-phase absorption spectra of meso - tetraphenylporphyrin (TPP) and copper TPP were examined. The spectra thus obtained were free of the shifts caused by the natural tendency of porphryn molecules to aggregate or to interact with solvents.

AD-632 101 Fld. 7/3
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
TRIFERROCENYLPHOSPHINE AND DIFERROCENYLPHOSPHINOUS CHLORIDE. NOVEL PREPARATION, AND CHARACTERIZATION,
Technical research article,
by Gilbert P. Sollott, and William R. Peterson Jr. 2 Jul 65, 9p. Rept. no. A65-13,
Proj. DA-1C014501B13A,
Unclassified report

Availability: Published in Journal of Organometallic Chemistry v4 p491-3 1965. Copies to DDC users only.

Descriptors: (*Ferrocenes, Synthesis (Chemistry)), (*Organic phosphorus compounds, Ferrocenes), (*Phosphines, Synthesis (Chemistry)), Chemical properties, Amides, Catalysts, Sulfides, Selenides, Chlorides, Phosphine oxides

Triferrocenylphosphine and diferrocenylphosphinous chloride, compounds previously unknown, were prepared by the novel reaction of ferrocene with N,N-diethylphosphoramidous dichloride in the presence of anhydrous aluminum chloride. The phosphine was converted to the sulfide and selenide, the phosphinous chloride to the secondary phosphine oxide. (Author)

AD-632 213 Fld. 7/3
STANFORD UNIV CALIF DEPT OF CHEMISTRY
BICYCLO (2.1.0)PENT-2-ENE,
by John I. Brauman, Larry E. Ellis, and Eugene E. van Tamelen. 27 Dec 65, 3p. Contract DA-31-124-ARO (D)-285, Proj. DA-ARO (D)-CRD-AA-5227-C,
AROD 5227:1
Unclassified report

Availability: Published in Journal of the American Chemical Society v88 n4 p846-8 Feb 20 1966. Copies to DDC users only.

Descriptors: (*Cycloalkenes, Synthesis (Chemistry)), (*Polycyclic compounds, Synthesis (Chemistry)), Separation, Molecular structure, Nuclear magnetic resonance, Pyrolysis, Chemical reactions

A description is given of the preparation, isolation, and identification of bicyclo (2.1.0)pent-2-ene ('homocyclobutadiene'), valence bond isomer of cyclopentadiene and the smallest unsaturated polycycle yet secured in the organic laboratory.

AD-632 214 Fld. 7/3
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
PYROLYSIS OF SEC-BUTYL ACETATE. STEREOSPECIFIC CIS ELIMINATION,
by P. S. Skell, and W. L. Hall. 23 Oct 63, 2p. Contract DA-31-124-ARO (D)-303,
AROD 4855:4
Unclassified report

Availability: Published in Journal of the American Chemical Society v86 p1557-8 1964. Copies to DDC users only.

Descriptors: (*Stereochemistry, Acetates), (*Acetates, Pyrolysis), Elimination reactions, Alkenes, Synthesis (Chemistry)

The acetates of d,l-threo- and d,l-erythro-3-deuterio-2 -butanol were pyrolyzed at 400C. Both cis- and trans-2 -butenes were formed in stereospecific cis eliminations. (Author)

AD-632 215 Fld. 7/3, 7/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
REACTIONS OF FREE, GROUND-STATE DICHLOROCARBENE,
by L. D. Wescott, and P. S. Skell. 21 Dec 64, 4p. Contract DA-31-124-ARO (D)-303,
AROD 4855:5
Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p1721-4 (1965). Copies to DDC users only.

Descriptors: (*Chlorine compounds, Chemical reactions), (*Halogenated hydrocarbons, Chemical reactions), Chloroform, Carbon tetrachloride, pyrolysis, Alkenes, Cyclopropanes, Alkenes, Stereochemistry, Atomic energy levels, Butane, Synthesis (Chemistry)

Dichlorocarbene was generated under vacuum by the pyrolysis of chloroform or carbon tetrachloride, at temperatures in the neighborhood of

1500C, and allowed to react with olefinic substrates on a liquid nitrogen cooled surface. The products are the expected 1,1dichlorocyclopropanes. The additions to cis- and to trans-2-butenes were stereospecific. Free CC12, the precursor of these products, had been generated under spin relaxing conditions, thus indicating a singlet ground state. (Author)

AD-632 216 Fld. 7/3, 7/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
THE REACTIONS OF CARBON ATOMS WITH CHLORINATED HYDROCARBONS,
by P. S. Skell, and R. F. Harris. 26 Aug 65, 1p. Contract DA-31-124-ARO (D)-303, AROD 4855:8

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p5807 1965. Copies to DDC users only.

Descriptors: (*Carbon, Chemical reactions), (*Halogenated hydrocarbons, Chemical reactions), Chlorine compounds, Carbon tetrachloride, Chloroform, Chlorides, Ethylenes, Propanes, Cyclopropanes, Bromine compounds, Atomic energy levels, Butane

The reaction of carbon atoms with carbon tetrachloride yields two products, tetrachloroethylene and octachloropropane. Carbon atoms react with chloroform in a similar manner, yielding trichloroethylene (84%) and 1,1,2,2,3,3,-hexachloropropane (16%). The reaction of carbon atoms with t-butyl chloride produces 1-chloro-2,2-dimethylcyclopropane as the major product. The free alpha-halocarbenes undergo cyclization to halocyclopropanes even when beta-hydrogens are available for migration. For example, ethyl bromide reacts with carbon atoms to form cyclopropyl bromide, bromopropenes, etc. Insertion of carbon atoms into carbon-chlorine bonds produces substituted alkylmonochlorocarbenes as intermediates. (Extracted)

AD-632 217 Fld. 7/3, 7/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
THE REACTIONS OF CARBON ATOMS WITH SATURATED HYDROCARBONS,
by R. R. Engel, and P. S. Skell. 16 Aug 65, 1p. Contract DA-31-124-ARO (D)-303, AROD 4855:7

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p4663 1965. Copies to DDC users only.

Descriptors: (*Carbon, Chemical reactions), (*Alkanes, Chemical reactions), (*Cycloalkanes, Chemical reactions), Propanes, Cyclopropanes, Butane, Atomic energy levels

The reaction of carbon atoms with 2-methylpropane yields two products which have added a carbon atom, 1,1-dimethylcyclopropane and 2-methylbutane. The reaction of carbon atoms with cyclopropane gave as the major product methylenecyclopropane (65%). There were also isomeric C6 materials, presumably radical coupling products, but no acetylene was formed. All products resulted from reactions of the 1S state of carbon. In studies where 1D and 3P species only were present no products were formed. The insertion of singlet carbon atoms into C-H bonds of paraffin hydrocarbons produces monoalkylcarbenes as intermediates. (Extracted)

AD-632 255 Fld. 7/3
STANFORD RESEARCH INST MENLO PARK CALIF
LIQUID-PHASE OXIDATIONS OF CYCLIC ALKENES,
by Dale E. Van Sickle, Frank R. Mayo, and Richard M. Arluck. 22 May 65, 11p. Contract AF 49 (638)-1102, AFOSR 66-0686

Unclassified report

Presented at the National Meeting of the American Chemical Society (145th), 10 Sep 63.

Availability: Published in Journal of the American Chemical Society v87 n21 p4824-32 Nov 5 1965. Copies to DDC users only.

Descriptors: (*Cycloaltenes, Oxidation), Molecular structure, Cyclopentenes, Cyclohexenes, Cyclooctane derivatives, Cyclohexanes, Reaction kinetics, Peroxides, O-heterocyclic compounds, Aldehydes, Polymerization

The work was undertaken to relate the initial products of liquid-phase oxidations of unsaturated hydrocarbons under mild conditions (and thus their mechanisms of oxidation) to the structures of the hydrocarbons. Results with cyclopentene, cyclohexene, cycloheptene, cyclooctene, cyclododecene, methylenecyclohexane, and vinylcyclohexane at 50-70C are discussed in terms of the addition and hydrogen -abstraction mechanisms. Indicated rates of addition of alkylperoxy radicals to the corresponding cyclic alkenes are very similar. Indicated rates of abstraction (per hydrogen atom) differ by a factor of 22 and depend partly on the degree of reorganization required to give a planar allyl radical. In over-all rate of oxidation, cyclopentene is most reactive and cyclooctene is least reactive. While the other alkenes give mostly allylic hydroperoxides, 70% of the cyclooctene reacts by the addition mechanism, producing epoxide, suberic aldehyde, and polymer. These results are compared with the work of others. The dimeric peroxides from cyclopentene and cyclohexene are shown to be 2-(3-cycloalkenylperoxy)cycloalkanyl hydroperoxides. (Author)

AD-632 256 Fld. 7/3
STANFORD RESEARCH INST MENLO PARK CALIF
THE LIQUID-PHASE OXIDATION OF CYCLOPENTENE,
by Dale E. Van Sickle, Frank R. Mayo, and Richard M. Arluck. 22 May 65, 8p. Contract AF 49 (638)-1102, AFOSR 66-0698

Unclassified report

Presented at the National Meeting of the American Chemical Society (148th), Chicago, Ill., 4 Sep 64.

Availability: Published in Journal of the American Chemical Society v87 n21 p4832-7 Nov 5 1965. Copies to DDC users only.

Descriptors: (*Cyclopentenes, Oxidation), (*Catalysis, Cyclopentenes), Alkenes, Peroxides, Solvents, Reaction kinetics, Catalysts

Work was undertaken to elucidate autocatalysis in the autoxidation of alkenes. Cyclopentene was chosen for study because it gives a high yield to hydroperoxide (75%) at 50C. In benzene solution, the rate of oxidation is first order in cyclopentene. In neat cyclopentene, the rate is half order in azo initiator and first order in added 3-cyclopentenyl hydroperoxide. The rate of initiation by hydroperoxide corresponds closely to its second-order rate of decomposition; it is an efficient initiator of oxidation. The hydroperoxide is more stable in benzene solution and no autocatalysis of the oxidation of cyclopentene is observed in benzene at 50C. Relations between hydroperoxide concentrations and rates of oxidation show that a retarder is formed during the autoxidation of cyclopentene. An intermediate steady rate of oxidation therefore may only represent a transition from initial autocatalysis to later autoretardation. (Author)

AD-632 262 Fld. 7/3, 11/9
IOWA UNIV IOWA CITY DEPT OF CHEMISTRY
LADDER POLYQUINOXALINES,
by J. K. Stille, and E. Mainen. 22 Oct 65, 3p. Contract DA-31-124-ARO (D)-295, AROD 5199:1

Unclassified report

Availability: Published In Polymer Letters, v4 p39-41 1966. Copies to DDC users only.

Descriptors: (*N-heterocyclic compounds, *Polymers), (*Quinones, Polymerization), Condensation reactions, Solvents, Molecular structure, Solubility, Stability, Thermogravimetric analysis, Benzenes, Amines, Polycyclic compounds

The condensation of stoichiometric amounts of 2,5-dihydroxy-p-benzoquinone and 1,2,4,5-tetramine benzene tetrahydrochloride in solvents such as dimethylacetamide (DMAC), hexamethylphosphoramide (HMP), and polyphosphoric acid afforded black polymer to which a polyquinoxaline structure was assigned. The polymers formed in DMAC and HMP could be redissolved in the polymerization solvents, but when heated under reduced pressure to remove all traces of the polymerization solvent, the polymers became insoluble. This unusual phenomenon may be due to a particularly stable solvent association with the molecule, since about 20 wt.-% of DMAC, for example, is removed only on prolonged heating under reduced pressure. Polymers thus obtained, which were heated at 375C. under reduced pressure in an attempt to increase the molecular weight, became mostly insoluble. The thermal gravimetric analyses of polymer samples unfortunately showed stability in air only as good as that of the linear polyquinoxalines, so that the ladder structure is probably incomplete. The inability of this reaction to provide a complete ladder can probably be blamed on the quinone monomer, which is not a true tetraketone. (Extracted)

AD-632 268 Fld. 7/3, 20/12
CFSTI Prices: HC $1.00 MF $0.50
TEXAS UNIV AUSTIN DEPT OF CHEMISTRY
OXIDATION OF AROMATIC COMPOUNDS BY ELECTRON TRANSFER.
Final rept. 1 Oct 61-31 Dec 65, by Michael J. S. Dewar. 31 Dec 65, 16p. Contract AF-AFOSR-62-104,AF-AFOSR-528-64 AFOSR 66-0714

Unclassified report

Descriptors: (*Aromatic compounds, Oxidation), (*Oxidizers, *Metalorganic compounds), (*Semiconductors, Organic materials), Cobalt compounds, Manganese compounds, Toluenes, Naphthalenes, Phenyl ethers, Amines, Anthracenes, Acetates

The work was concerned with a general survey of reactions of aromatic compounds involving oxidizing agents which are derivatives of metals in high valence states. An extensive qualitative survey suggested that many aromatic compounds undergo oxidation by such reagents, by mechanisms in which the key step is indeed an electron transfer. A number of these reactions lead to products different from those given by other oxidizing agents, and it seems likely that procedures of this kind may prove to be of value in synthesis. Apart from possible practical applications; reactions of this kind may help to throw light on the nature of the electron transfer process. As a byproduct of this work, an inquiry was made into the role of metal coordination polymers as electron transfer agents and possible semiconductors. A number of such compounds were prepared and found to show semiconduction, their properties being at least as good as those of any previously described organic materials. They should function as one-dimensional semiconductors, unlike most conventional materials such as germanium or silicon.

AD-632 298 Fld. 7/3
WISCONSIN UNIV MADISON DEPT OF CHEMISTRY

NEW THERMAL REARRANGEMENTS OF TROPILIDENES,
by Jerome A. Berson, and M. Robert Willcott,III.. 17 Apr 65, 2p. Contract DA-ARO (D)-31-124-G497,
AROD 3921:4

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p2751-2 1965. Copies to DDC users only.

Descriptors: (*Cycloalkenes, Chemical reactions), Monocyclic compounds, Molecular structure, Dienes, Synthesis (Chemistry)

Two new intramolecular thermal transformations of the tropilidene skeleton are reported, one of which leads to rearranged tropilidenes and the other to 1,4-cyclohexadienes.

AD-632 327 Fld. 7/3
KANSAS STATE UNIV MANHATTAN DEPT OF CHEMISTRY
A CONVENIENT SYNTHESIS OF ESTER P-TOSYLHYDRAZONES AND STUDIES OF THE THERMAL DECOMPOSITION OF SOME OF THEIR SODIUM SALTS,
by Richard M. McDonald, and Robert A. Krueger. 2 Jul 65, 10p. Contract AF-AFOSR-145-63, Proj. AF-9762, Task 976202,
AFOSR 66-0687

Unclassified report

Availability: Published in Journal of Organic Chemistry v31 p488-94 Feb 1966. Copies to DDC users only.

Descriptors: (*Organic sulfur compounds, Synthesis (Chemistry)), (*Hydrazones, Synthesis (Chemistry)), Esters, Hydrazines, Formates, Acetates, Benzoates, Sodium compounds, Pyrolysis, Hydrides, Chemical reactions

Ester p-tosylhydrazones are obtained in good yields from reactions of ortho esters and p-tosylhydrazine. The reactions of three of these ester p-tosylhydrazones, derived from methyl orthoformate, ethyl orthoacetate and methyl orthobenzoate, with sodium hydride and the thermal decompositions of the product sodium salts are discussed. The products of these thermolyses are rationalized as being formed by two major reaction paths in the initial reacrions with sodium hydride: (1) salt formation, the expected process; and (2) nucleophilic attack of hydride at carbon of the carbon-nitrogen double bond of the hydrazone. The substituent other than the alkoxyl group on this carbon atom is apparently the controlling factor as to which of these two routes predominates. (Author)

AD-632 427 Fld. 7/3
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
STUDIES IN PHOSPHINEMETHYLENE CHEMISTRY. XIII. ROUTES TO TRIPHENYLPHOSPHINE-HALOMETHYLENES AND DIHALOMETHYLENES,
by Dietmar Seyferth, James K. Heeren, Gurdial-Singh, Samuel O. Grim, and William B. Hughes. 26 Jul 65, 8p. Contract DA-ARO (D)-31-124-G495,
AROD 2832:27

Unclassified report

See also AD-623 344.

Availability: Published in Journal of Organometallic Chemistry v5 p267-74 1966. Copies to DDC users only.

Descriptors: (*Phosphines, Chemical reactions), (*Organic phosphorus compounds, Synthesis (Chemistry)), (*Halogenated hydrocarbons, Synthesis (Chemistry)), (*Mercury compounds, *Metalorganic compounds), Lithium compounds, Bromine compounds, Iodine compounds, Alkenes, Cyclohexanones

The action of phenyllithium on (bromomethyl)triphenylphosphonium bromide results in a nearly equimolar mixture of triphenylphosphine bromomethylene (formal H (+) abstraction) and triphenylphosphine *methylene (formal Br (+) abstraction). With (iodomethyl)triphenylphosphonium iodide a mixture of triphenylphosphine iodomethylene and triphenylphosphine methylene is formed in which the latter is favored by a factor of about three. A new route to haloolefins based on phenyl (halomethyl)mercurial reagents is summarized by the following equations (X = Cl and Br): C6H5HgCX2Br + (C6H5)3P + RR'C=O (to) RR'C=CX2 + C6H5HgBr + (C6H5)3PO; C6H5HgCHXBr + (C6H5)3P + RR'C=O (to) RR'C=CHX + C6H5HgBr + (C6H5)3PO. (Author)

AD-632 443 Fld. 7/3
IOWA STATE UNIV OF SCIENCE AND TECHNOLOGY AMES DEPT OF CHEMISTRY
METHYLATION OF AROMATIC HYDROCARBONS BY DIMETHYL SULFOXIDE IN THE PRESENCE OF BASE,
by Glen A. Russell, and Steven A. Weiner. 9 Sep 65, 4p. Contract DA-ARO (D)-31-124-G492, AROD 4315:1

Unclassified report

Availability: Published in Journal of Organic Chemistry, v31 p248-51 1966. Copies to DDC users only.

Descriptors: (*Aromatic compounds, *Substitution reactions), (*Sulfoxides, Substitution reactions), Quinolines, Anthracines, Phenanthrenes, Acribines, N-heterocyclic compounds, Polycyclic compounds, O-heterocyclic compounds, Ions, Chemical reactions, Bases (Chemistry)

The methylsulfinyo carbanion (CH3SOCH2 (-)) is a unique methylating agent of the ylide type. Quinoline, isoquinoline, anthracene, phenanthrene, acridine, phenanthridine, and benzoxazole are converted to methyl derivatives by reaction with methylsulfinylcarbanion in dimethyl sulfoxide solution at 70C. (Author)

AD-632 464 Fld. 7/3, 7/2
WISCONSIN UNIV MADISON DEPT OF CHEMISTRY
PI-BONDED ORGANOSILICON COMPOUNDS.
Final rept., 1 Feb 64-31 Jan 65,
by Robert West. 12 Apr 66, 10p. Contract AF-AFOSR-623-64, Proj. AF-9762, Task 976202, AFOSR 0728

Unclassified report

A reprint entitled 'Silicon shifts from nitrogen to nitrogen' is attached.

Availability: Published in Chemical and Engineering News p44-6 April 12, 1965. Copies to DDC users only.

Descriptors: (*Silanes, Chemical properties), Heterocyclic compounds, Phenanthrenes, Lithium compounds, Metalorganic compounds, Catalysts, Dienes, Hydrazine derivatives, Free radicals, Electron spin resonance, Molecular orbitals, Chemical bonds, Monocyclic compounds, Alkynes

Four major scientific advances in the chemistry of organosilicon compounds are reported. (1) The first heteroaromatic silicon compound, 10, 10-dimethyl-10, 9-silazarophenanthrene, was prepared and studied. (2) The first perlithium compound, C3Li4, was synthesized from propyne and n-butyllithium. It reacts with trimethylchlorosilane to give tetrakis (trimethylsilyl) allene. (3) A new rearrangement reaction was discovered, in which organosilicon substituents shift from one nitrogen atom to another in organosilyl hydrazines. (4) The cyclic polysilicon compound (Si (CH3)2) 6 was reduced to an anion radical. Electron spin resonance spectra of the anion radical indicate that the unpaired electron is delocalized over all six silicon atoms. (Author)

AD-632 588 Fld. 7/3
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
THE SYNTHESIS AND DECOMPOSITION KINETICS OF SOME PARA-SUBSTITUTED TRANS - GAMMA - BENZYLIDENEBUTYRYL PEROXIDES. THE EXCESS ALPHA, GAMMA-BIS (BIPHENYLENE)-BETA-PHENYLALLYL METHOD FOR THE DETERMINATION OF INITIATOR KINETICS,
by Robert C. Lamb, Leonard P. Spadafino, Ronald G. Webb, Earl B. Smith, and Wallace E. McNew. 13 Aug 65, 10p. Contract AF-AFOSR-62-53,
AFOSR 66-0583

Unclassified report

Availability: Published in Journal of Organic Chemistry v31 p147-53 Jan 1966. Copies to DDC users only.

Descriptors: (*Free radicals, Thermal stability), (*Peroxides, Reaction kinetics), Synthesis (Chemistry), Decomposition, Aromatic compounds, Organic solvents, Volumetric analysis, Spectra (Infrared)

Syntheses are described for four trans-5- (p-X-phenyl)4-pentenoyl peroxides and their precursors, in which the substituents X are Cl, F, CH3, and OCH3. The decomposition kinetics of these peroxides, as well as the parent peroxide (X = H) were determined in benzene at 50, 60, and 70C by measuring the fading of the stable radical alpha, gamma-bis (biphenylene)-beta-phenylallyl (BDPA); the free-radical efficiencies of the peroxide decompositions were obtained in the same experiments. The rate constants obtained in this way compare exceedingly well with those obtained by iodometric titration, in experiments carried out in benzene-5% styrene. At 50C, log k for the five peroxides gives a linear plot against sigma (+), with rho = -1.16. Similar decompositions were carried out in propylene carbonate. All of the peroxides decompose more rapidly and form free radicals less efficiently in this highly polar solvent. The kinetics results for decompositions of the trans-5- (p-X-phenyl)-4-pentenoyl peroxides are interpreted in terms of mechanisms originally proposed by Lamb, et al., for the decomposition of the parent compound (X = H). (Author)

AD-632 589 Fld. 7/3
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
AN UNUSUAL SOLVENT EFFECT ON THE AIR OXIDATION OF A STABLE CARBANION,
by J. Grady Pacifici. 26 Apr 65, 2p. Contract AF-AFOSR-62-53,
AFOSR 66-0313

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p3014 1965. Copies to DDC users only.

Descriptors: (*Free radicals, Oxidation), Ions, Solvents, Reaction kinetics, Molecular association

The rate constants for the air oxidation of the carbanion (R-1) related to Koelsch's radical (R., 2-phenylbis (biphenylene)allyl) vary through a series of aprotic solvents by a factor of at least 100000. This effect is novel both in the kind of reaction involved and in that more polar solvents inhibit, rather than enhance, the rate of a carbanion reaction.

AD-632 591 Fld. 7/3, 7/4
UTAH STATE UNIV LOGAN DEPT OF CHEMISTRY

PYROLYSIS STUDIES. PART XVI. A MECHANISTIC STUDY OF THE PYROLYSIS OF BETA-HYDROX -OLEFINS,
by Grant Gill Smith, and Brian L. Yates. 29 Dec 64, 6p. Contract AF-AFOSR-62-268, Proj. AF-9762, Task 976202,
AFOSR 66-0567

Unclassified report

See also AD-624 374.

Availability: Published in Jou nal of the Chemical Society v1331 p7242-6 Dec 1965. Copies to DDC users only.

Descriptors: (*Pyrolysis, Reaction kinetics), (*Alcohols, Pyrolysis), (*Alkenes, Pyrolysis), Molecular structure, Chemical bonds, Molecular orbitals, Esters, Heat of activation

The pyrolysis of beta-hydroxy-olefins to olefins and carbonyl compounds was shown to be a first-order homogeneous unimolecular reaction. Alkyl groups at the 1-position of but-3-en-1-ol have much less effect on the rate of pyrolysis than when they are in a structurally similar position of ethyl formate. This implies that there is less heterolytic splitting of the C-CHOH bond in beta-hydroxy-olefins in the transition state than C-O splitting in ester pyrolysis. A 3-phenyl substituent in but-3-en-1-ol increases the rate of pyrolysis more than similar substitution in ethyl formate. Apparently there is greater use of the pi-electrons in the transition-state pyrolysis of beta-hydroxyolefins than in ester pyrolysis. Tertiary alcohols decompose more readily than secondary and primary alcohols. A comparison of the entropies of activation indicates that tertiary alcohols are in a more favourable conformation for thermal decomposition than the primary alcohols. (Author)

AD-632 593 Fld. 7/3
CFSTI Prices: HC $1.00 MF $0.50
BROWN UNIV PROVIDENCE R I
NUCLEOPHILIC DISPLACEMENTS ON PHOSPHONIC ACID ESTERS.
Quarterly rept. no. 5, 1 Sep 65-30 Apr 66,
by J. O. Edwards, M. J. Biallas, H. J. Brass, and R. A. DiPrete. 30 Apr 66, 13p. Contract DA-18-035-AMC-274 (A),

Unclassified report

Descriptors: (*Phosphonic acids, Displacement reactions), (*Hydroxamic acids, Displacement reactions), (*Amines, Displacement reactions), Esters, Organic phosphorus compunds, pH, Reaction kinetics, N-heterocyclic compounds

Data on the reaction of p-nitrophenyl methylphosphonate with a variety of hydroxamic acids is reported and discussed. Various experimental difficulties served to limit the number of successful trials. An attempt to obtain Bronsted plot for the observed data showed a small dependence upon the basicity of the hydroxamic acid. Consideration is also given to the reaction of p-nitrophenyl methylphosphonate with a series of tertiary amines. A Bronsted plot of amine pKa vs. log K2 (second order rate constant) has a slope of 0.31. It was also observed that only freshly distilled amines gave consistent rate data. A small rate enhancement was noted with an increase in ionic strength. (Author)

AD-631 851 **See Fld. 11/6**

AD-631 973 **See Fld. 20/5**

AD-631 995 **See Fld. 6/1**

AD-632 035 **See Fld. 11/10**

AD-632 065 **See Fld. 7/2**

AD-632 084 **See Fld. 7/4**

AD-632 328 **See Fld. 7/4**

AD-632 329 **See Fld. 7/4**

AD-632 418 **See Fld. 7/2**

AD-632 448 **See Fld. 7/2**

7/4. PHYSICAL CHEMISTRY

AD-631 858 Fld. 7/4, 9/2
CFSTI Prices: HC $2.00 MF $0.50
MALLINCKRODT CHEMICAL LAB HARVARD UNIV CAMBRIDGE MASS
A GENERAL PROGRAM FOR THE CALCULATION OF INTERNAL ROTATION SPLITTINGS IN MICROWAVE SPECTROSCOPY.
Technical research rept.,
by Robert C. Woods. 1964, 30p. Contract Nonr-1866 (14)

Unclassified report

Descriptors: (*Programming (Computers), *Molecular rotation), (*Microwave spectroscopy, Molecular rotation), Hamiltonian, Molecular spectroscopy, Quantum mechanics, Programming languages

A theoretical basis is presented for a computer program which has been written to calculate the internal rotation splittings in the microwave spectra of molecules possessing a hindered internal symmetric top. This is an extension of the internal axis method and is applicable to a very general case, which includes any high barrier problem which is not a near spherical top. Any asymmetry, any geometry, and any size top can be handled by the program as it stands. The method involves the division of the Hamiltonian into a rotational part and a part involving internal rotation, the latter including the coupling between internal and overall rotation. The matrix elements of these parts are set up separately, each in the most convenient basis, then transformed to a common basis (symmetric rotor in principal axes), then to the Wang basis, and finally to the basis which diagonalizes the (large) rigid rotor part. The small off-diagonal elements which are left are treated by perturbation theory. This procedure has been incorporated in an efficient Fortran program which uses fully the various symmetry properties. (Author)

AD-631 924 Fld. 7/4, 11/6, 20/13
CFSTI Prices: HC $1.10 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
PARAMETERS CONTROLLING SOLUBILITY IN DILUTE LIQUID METAL SYSTEMS.
Memo. rept.,
by S. W. Strauss. Sep 61, 10p. Rept. no. NRL-MR-1203,
Proj. RR-007-01-46-5411,

Unclassified report

See also AD-136 951.

Descriptors: (*Liquid metals, Solvent action), Atomic structure, Solubility, Thermodynamics, Rubidium, Cesium, Containers

Ordinate intercepts, B, at 1/T degrees K = 0 on log (atomic fraction solute) versus 1/T degrees K plots for 37 binary systems were correlated with the atomic size factor which was defined as the ratio of the atomic radius of the solvent atom divided by the atomic radius of the solute atom. The results suggest that like the temperature coefficient of solubility, the ordinate intercept is strongly dependent on the disparity in the atomic radii of solvent and solute atoms. On the basis of these correlations, bearing in mind the still preliminary status of the correlations, suggestions were made regarding possible container materials for liquid Rb and liquid Cs. (Author)

AD-631 999 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
FRICK CHEMICAL LAB PRINCETON UNIV N J
INFRARED AND RAMAN SPECTRA OF CARBON SUBOXIDE IN CONDENSED PHASES.
Technical rept.,
by Wm. Hayden Smith, and George E. Leroi. Jan 66, 43p. Rept. no. TR-2,
Contract Nonr-1858 (48), Proj. NR-051-466,

Unclassified report

Prepared for publication in the Journal of Chemical Physics.

Descriptors: (*Carbon compounds, *Spectra (Infrared)), (*Raman spectroscopy, Carbon compounds), Oxides, Liquids, Crystals

Infrared and Raman spectra of liquid, crystalline, and matrix isolated carbon suboxide have been obtained in the region 20 to 4000/cm. A previously unreported solid -solid transition has been observed at 115 plus or minus 5K, and possible structures for both crystalline phases have been inferred from the spectroscopic results. The pi (u) central carbon bending mode, nu (7), has been identified in the liquid phase at 72 plus or minus 2/cm. The problem of 'disappearing' sum bands is discussed, and a revised vibrational assignment and force constant analysis for carbon suboxide is presented. (Author)

AD-632 000 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
FRICK CHEMICAL LAB PRINCETON UNIV N J
CORRELATION OF ELECTRONIC STRUCTURE AND BENDING FORCE CONSTANTS IN SOME LINEAR MOLECULES.
Technical rept.,
by Wm. Hayden Smith, and George E. Leroi.
Feb 66, 14p. Rept. no. TR-4,
Contract Nonr-1858 (48), Proj. NR-051-466,

Unclassified report

Submitted for publication in the Journal of Chemical Physics.

Descriptors: (*Polyatomic molecules, *Carbon compounds), Carbon dioxide, Molecular structure, Molecular orbitals, Nitrides, Hydrogen compounds, Sulfides, Valence, Electron density

A qualitative relationship between electron density about the central carbon atom and ease of bending is described for several triatomic and pentatomic linear molecules, including CO2, C3, CN2, C3H2, C3N2, C3O2, C3S2 and C3H4. Both valence bond and molecular orbital models are discussed. (Author)

AD-632 003 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
FRICK CHEMICAL LAB PRINCETON UNIV N J
THE INFRARED AND RAMAN SPECTRA OF CARBON SUBSULFIDE.
Technical rept.,
by Wm. Hayden Smith, and George E. Leroi.
Feb 66, 28p. Rept. no. TR-3,
Contract Nonr-1858 (48), Proj. NR-051-466,

Unclassified report

Submitted for publication in the Journal of Chemical Physics.

Descriptors: (*Carbon compounds, *Spectra (Infrared)), (*Raman spectroscopy, Carbon compounds), Sulfides, Spectra (Visible + ultraviolet)

Infrared and Raman spectra of carbon subsulfide (C3S2) in various phases have been obtained in the region 30 to 4000/cm. Mass and ultraviolet spectra are also presented. Analysis of the vibrational spectra indicates a D (infinity h) structure. Of particular interest is the 94/cm band assigned as nu (7), the central carbon bending frequency, which lies at a higher frequency than the analogous band in C3O2. A vibrational analysis has also been performed. (Author)

AD-632 038 Fld. 7/4, 20/10
ILLINOIS UNIV URBANA DEPT OF PHYSICS
PRESSURE BROADENING AS A MANY-BODY PROBLEM,
by David W. Ross. 12 Aug 65, 29p. Contract DA-31-124-ARO (D)-114, AROD 431:70
Unclassified report

Availability: Published in Annals of Physics, v36 n3 p458-85 Feb 1966. Copies to DDC users only.

Descriptors: (*N-body problem, *Line spectrum), Pressure, Quantum mechanics, Field theory, Matrix algebra, Atomic spectroscopy

The correlation functions of the many-body system are introduced to describe pressure broadening of spectral lines in a gas. The line shape is determined from the imaginary part of the frequency- and wave vector-dependent dielectric susceptibility. A T-matrix expansion is used to rederive Baranger's impact approximation, which is shown to be exact in the low density limit, provided that either the mass of the foreign particles is very different from that of the radiating atoms, or the scattering is predominantly in the forward direction. The T-matrix equations contain the full kinematics of the interacting atoms, permitting the treatment of scattering of particles of arbitrary mass at arbitrary angles. The line shape contains all the effects of the velocity distribution of the atoms, including Doppler broadening. The application to resonant self-broadening is mentioned briefly, and some terms of higher order in the density are discussed. (Author)

AD-632 059 Fld. 7/4
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
TRANSITION POSSIBILITIES IN THE AR I SPECTRUM,
by R. H. Garstang, and Janet Van Blerkom. 3 May 65, 4p. Contract DA-31-124-ARO (D)-139, AROD 4445:40
Unclassified report

Supported in part by ARPA, Proj. Defender. Prepared in Cooperation with Colorado Univ., Boulder.

Availability: Published in Journal of the Optical Society of America v55 n9 p1054-7 Sep 1965. Copies to DDC users only.

Descriptors: (*Argon, Atomic spectroscopy), Line spectrum, Atomic energy levels, Electron transitions, Probability, Tables, Optics

Relative line strengths were computed for the transition arrays of 3p (5)4s-3p (5)4p and 3p (5)4s-3p (5)5p in Ar I. Intermediate-coupling theory was used, starting from LS coupling, and using the experimental energy levels as data for determining the parameters of the theory by least -squares adjustment of the calculated energies. The results have been placed on an absolute scale using the Coulomb approximation. The Lande g factors computed agree well with the observed values. The calculated transition probabilities are in fairly satisfactory agreement with various experimental determinations, and this agreement is better than that obtained using either LSor jl-coupling calculations. The results for the 4s-4p array appear to be more accurate than those for the 4s-5p array. (Author)

AD-632 064 Fld. 7/4, 7/2, 7/5
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICAL CHEMISTRY
THE RELATION BETWEEN ELECTROCHEMICAL AND SPECTROSCOPIC PROPERTIES OF THE HALIDE AND PSEUDOHALIDE IONS IN SOLUTION,
by E. Gusarsky, and A. Treinin. 10 Mar 65, 2p. Contract DA-91-591-EUC-3583,
Unclassified report

Availability: Published in Journal of Physical Chemistry v69 n9 p3176-7 Sep 65. Copies to DDC users only.

Descriptors: * (*Halides, Band spectrum), (*Cyanates, Band spectrum), Thiocyanates, Selenium compounds, Tellurium compounds, Electrochemistry, Spectroscopy, Absorption spectrum, Photolysis, Israel

Some results concerning the band spectra of the thiocyanate, selenocyanate, and tellurocyanate anions are reported; and the relation between the halide-pseudohalide electrochemical and spectroscopic series is shown.

AD-632 084 Fld. 7/4, 7/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
FACTORS AFFECTING THE SURFACE-CHEMICAL DISPLACEMENT OF BULK WATER FROM SOLID SURFACES.
Interim rept.,
by H. R. Baker, C. R. Singleterry, and W. A. Zisman. 24 Feb 66, 14p. Rept. no. NRL-6368, Proj. RR-001-01-43-4752,
Unclassified report

Descriptors: (*Surface-active substances, *Moistureproofing), (*Organic compounds, Moistureproofing), (*Water, Displacement reactions), Surface tension, Surface area, Solubility, Films, Transport properties

Bulk water films can be displaced from a solid surface by a spreading organic liquid which creates and maintains a surface tension gradient in the air/liquid interface. Such a gradient can be maintained if the spreading agent escapes from the air/water interface by solution or evaporation after a few centimeters of travel away from the point of application. The resulting movement of the surface film sweeps along the water beneath by viscous entrainment (Marangoni effect). Displacement is effective and lasting only when the displacing agent (or a surface-active material dissolved in it) is strongly adsorbed to form an insoluble hydrophobic film on the solid surface. Effective water-displacing agents at 20C should have the following properties: a spreading pressure above 25 dynes/cm on water a boiling point above 90C, and a solubility in water of between 2 and 25 percent by weight. The equilibrium spreading pressures for members of a given class of polar organic compounds decrease with rising boiling point. (These principles are well exemplified by a solution in normal butanol of 3 percent of basic barium dinonylnaphthalene sulfonate.) Such water-displacing agents have been found suitable in numerous applications. (Author)

AD-632 104 Fld. 7/4, 6/1, 11/11
CFSTI Prices: HC $3.00 MF $0.75
NAVAL RESEARCH LAB WASHINGTON DC
SURFACE CHEMISTRY OF PROTEINS AND POLYPEPTIDES.
Interim rept.,
by G. I. Loeb. 30 Nov 65, 81p. Rept. no. NRL-6318,
Proj. RUDC-4B000/652-1/F101-99-01,
Unclassified report

Descriptors: (*Peptides, Surface properties), (*Proteins, Surface properties), Reviews, Pressure, Equations of state, Molecular weight, Polymers, Theory, Films, Adsorption, Enzymes, Thermodynamics, Bibliographies

The report is a review of recent literature in the field of polypeptide and protein surface chemistry, concentrating on the last decade. Theoretical approaches to polymers at liquid interfaces are considered, and surface measurement techniques are briefly outlined. The various classes of polypeptides are considered, followed by a discussion of proteins in general and specific proteins in particular. Enzymatic activity, structure, and adsorption at various surfaces are considered also. (Author)

AD-632 130 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
PRESSURE SHIFTS OF INFRARED LINES, LOW-TEMPERATURE SPECTRA OF MOLECULES, AND TECHNIQUES OF INTERFERENCE SPECTROSCOPY.
Annual summary rept. 1 Jan-31 Dec 65,
by J. H. Jaffe, and S. Kimel. Jan 66, 7p. Contract AF 61 (052)-838,
AFCRL 66-261
Unclassified report

Descriptors: (*Infrared spectroscopy, Reviews), (*Line spectrum, Pressure), (*Low-temperature research, Infrared spectroscopy), (*Interference, Infrared spectroscopy), Band spectrum, Hydrogen compounds, Fluorides, Water vapor, Refractometers, Solidified gases, Helium group gases, Hydrochloric acid, Interferometers, Integral transforms, Theory, Israel

Brief summaries are given of progress and results in the following phases of infrared spectroscopy research (numbers indicate AD reports in which detailed accounts are given): study of pressure induced shifts of vibration -rotation lines of polar gases (AD-626 202); measurement of the refraction spectrum through individual vibration - rotation lines (AD-628 779); study of intermolecular forces by means of low-temperature spectroscopy (AD-628 750); investigation of noise and errors in Fourier-Transform spectroscopy; study of width and shift of far - infrared lines; theoretical investigation complementing the experimental work (AD-627 042).

AD-632 151 Fld. 7/4
LINCOLN LAB MASS INST OF TECH LEXINGTON
PRESSURES OF HG AND SELENIUM OVER HGSE (C) FROM OPTICAL DENSITY MEASUREMENTS,
by Robert F. Brebrick. 9 Jul 65, 8p. Rept. no. JA-2610,
Contract AF 19 (628)-5167,
ESD TDR-66-50
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n11 p3846-52 Dec 1 1965. Copies to DDC users only.

Descriptors: (*Mercury, Vapor pressure), (*Selenium, Vapor pressure), Mercury compounds, Selenides, Mercury alloys, Selenium alloys, Sublimation, Optical properties, Thermodynamics, Heat of formation, Phase studies

The optical density of the vapors at 860C that are in equilibrium with Hg-saturated, Se-saturated, and congruently subliming HgSe (c) in the range 450 to 816C was measured between 2000 and 7000A. No indication of the species HgSe (g) is found. Assuming the optical density is the sum of those obtained with pure Se and pure Hg, the partial pressure of Hg (g), pHg, and the total selenium pressure, P-sigma, are determined along a substantial portion of the HgSe (c) three-phase lines. Hg-saturated HgSe (c) is in equilibrium with essentially pure Hg (1) up to 659C and is at least 48.5 at. %Se. The total selenium pressure attains a maximum value of 0.62 atm for Se-saturated HgSe near 722C. The value of pHg for congruently subliming HgSe (c) is close to that required by the value of P-sigma and the published thermodynamics of selenium vapor. Between about 450 and 600C the standard Gibbs free energies of formation for both Se-saturated and congruently subliming HgSe (c) are obtained and are the same within experimental error. (Author)

AD-632 212 Fld. 7/4, 4/2
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
FORBIDDEN TRANSITIONS IN EXCITATION BY ELECTRON IMPACT,
by R. H. Garstang. 17 Sep 65, 2p. Contract DA-31-124-ARO (D)-139, AROD 445:36
Unclassified report

Prepared in cooperation with Dept. of Physics and Dept. of Astrophysics, Colorado Univ., Boulder.

Availability: Published in The Journal of Chemical Physics v44 n3 p1308-9 Feb 1 1966. Copies to DDC users only.

Descriptors: (*Electron transitions, Selection rules), (*Nitrogen, Electron transitions), (*Helium, Electron transitions), Excitation, Electron bombardment, Line spectrum

AD-632 226 Fld. 7/4, 20/10
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
VARIATIONAL APPROACH TO PERTURBATION THEORY. I. APPLICATION TO THE CALCULATION OF ATOMIC POLARIZABILITIES,
by H. J. Kolker, and H. H. Michels. 3 Mar 66, 12p. Contract AF 49 (638)-1133, Proj. AF-9750, Task 975002, AFOSR 66-0065
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n3 p1027-35 Aug 1 1965. Copies to DDC users only.

Descriptors: (*Perturbation theory, Atomic properties), (*Atomic properties, Polarization), (*Helium, Perturbation theory), (*Beryllium, Perturbation theory), Wave functions, Hydrogen, Lithium, Ions, Atomic orbitals, Atomic energy levels

A variational approach to perturbation theory is derived which establishes the relationship between variational and conventional approaches that utilize expansions in terms of atomic or molecular eigen-functions. This approach is based upon the observation that the variational approach to perturbation theory is formally equivalent to a variational method for constructing a special set of excited-state wave-functions. A mathematical demonstration of this equivalence is formulated. With the use of this new approach to perturbation theory, calculations were made of both the static and dynamic polarizabilities of the two-electron helium isoelectronic series, H (-), He, and Li (+) and a four-electron system represented by the beryllium atom. Multiconfiguration open-shell wavefunctions were employed. These flexible wavefunctions permit a quantitative analysis of the near-degenerate s-p orbital mixing in the ground state of the beryllium atom. The inclusion of this orbital degeneracy effect results in a substantial reduction in the calculated polarizability. (Author)

AD-632 328 Fld. 7/4, 7/3
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
EFFECT OF PRESSURE ON RADICAL YIELDS FROM PHENYLAZOTRIPHENYLMETHANE IN METHYLCYCLOHEXANE,
by Robert C. Lamb, and James G. Pacifici. 30 Sep 65, 6p. Contract AF-AFOSR-62-53, AFOSR 66-0587
Unclassified report

Availibility: Published in Journal of Physical Chemistry v70 p314-6 (1966). Copies to DDC users only.

Descriptors: (*Free radicals, Pressure), (*Aromatic compounds, Free radicals), Organic nitrogen compounds, Pyrolysis, Organic solvents, Cyclohexanes, Viscosity, Reaction kinetics, Thermochemistry

In the thermal decomposition of phenylazotriphenylmethane (PAT) in methylcyclohexane containing iodine, the efficiency of radical production, as measured by the yield of iodobenzene, is unusually sensitive to pressure. The efficiency of production of phenyl radicals from PAT was found to be related to the viscosity of the solvent. While previous investigations have pointed to define viscosity dependent effects on the extent of cage reaction, this work is the first example in which the viscosity change has been effected by means of pressure variations.

AD-632 329 Fld. 7/4, 7/3
CHICAGO UNIV ILL
THEORETICAL STUDIES OF TRANSANNULAR INTERACTIONS. I. BENZENE EXCIMER FLUORESCENCE AND THE SINGLET STATES OF THE PARACYCLOPHANES.
Revised ed.,
by Martin T. Vala Jr., Ian H. Hiller, Stuart A. Rice, and Joshua Jortner. 6 Jul 65, 15p. Contract AF-AFOSR-781-65, AFOSR 66-0680
Unclassified report

Revision of manuscript submitted 18 Dec 64.

Availability: Published in The Journal of Chemical Physics v44 n1 p23-35 Jan 1 1966. Copies to DDC users only.

Descriptors: (*Molecular association, Theory), (*Benzene, *Fluorescence), (*Polycyclic compounds, *Molecular energy levels), Molecular orbitals, Excitation, Emissivity, Absorption spectrum, Spectra (Visible + ultraviolet), Wave functions, Electron transitions, Single crystals

The changes in the electronic transition energies of benzene which occur on dimerization were calculated. It is shown that the energy-level splittings due to the interactions between neutral-excitation states are too small to explain the observed anomalous emission from concentrated benzene solutions and the absorption spectra of the paracyclophanes. To extend the theory, the eight-electron problem is treated for configurationally interacting neutral -excitation and charge-resonance states. Intermolecular overlap is included in a way consistent with the use of a core potential in the Goeppert-Mayer-Sklar representation. Use is also made of Huckel LCAO molecular orbital wavefunctions and a linear combination of four Slater carbon-atom 2p-pi wavefunctions fit to an SCF function. The anomalous emission from benzene solutions can now be understood to arise from transitions from the lowest excimer state of alpha-level parent age for benzene molecules approx. 3 or 3.3A apart when ground-state repulsion is taken into account. The solution absorption spectra of the paracyclophanes are interpreted within this framework of neutral-excitation-charge-resonance configuration interaction. Finally, dimer symmetries different from D6h, were investigated in an attempt to understand the absorption spectra of single crystals of paracyclophane. (Author)

AD-632 332 Fld. 7/4
UTAH UNIV SALT LAKE CITY DEPT OF CHEMISTRY
SOLVENT DEUTERIUM ISOTOPE EFFECTS ON INTRAMOLECULARLY HYDROGEN-BONDED DICARBOXYLIC ACID MONOANIONS,
by E. M. Eyring, and J. L. Haslam. 22 Jul 65, 6p. Contract AF-AFOSR-476-64, AFOSR 66-0679
Unclassified report

Availability: Published in Journal of Physical Chemistry v70 p293-6 1966. Copies to DDC users only.

Descriptors: (*Carboxylic acids, *Molecular association), Dissociation, Theory, Ions, Chemical equilibrium, Water, Heavy water, Reaction kinetics, Chemical bonds, Hydrogen, Molecular structure

There are many dicarboxylic acids having a much larger ratio of first to second acid dissociation constants than the value of 4 predicted from statistical theory. Such large differences have been ascribed to a strong intramolecular hydrogen bond in the acid monoanion. Equilibrium data in water and D2O at 25C for several such acids, and several rate constants, measured by the temperature-jump relaxation method, are presented which lend credence to the intramolecular hydrogen-bond hypothesis and which help elucidate the structure of the transition state.

AD-632 337 Fld. 7/4, 14/2
OREGON STATE UNIV CORVALLIS
USE OF O2 FOR ESR CALIBRATION FOR QUANTITATIVE MEASUREMENT OF GAS CONCENTRATIONS,
by K. M. Evenson, and D. S. Burch. 1 Oct 65, 1p. Contract DA-ARO (D)-31-124-G791, AROD 3512:2
Unclassified report

Availability: Published in Journal of Chemical Physics v44 n4 p1715-6 Feb 15 1966. Copies to DDC users only.

Descriptors: (*Gas analysis, *Electron spin resonance), (*Oxygen, Electron spin resonance), Calibration, Standards, Gases, Concentration (Chemistry), Manganese compounds, Sulfates, Organic nitrogen compounds

Further experimental support to that of Westenberg and deHaas for the use of gaseous molecular oxygen as a calibration standard for the measurement of paramagnetic gas concentrations with ESR spectrometers is presented. The accuracy of the intensity formulas of Tinkham and Strandberg for O2 was verified by a comparison of the results it gave with those obtained using two other standards, an aqueous solution of manganese sulfate and a sample of diphenylpicrylhydrazyl. The results permit the conclusion that molecular oxygen is an excellent gas for use as a calibration standard for ESR measurements of gaseous radical concentrations.

AD-632 338 Fld. 7/4, 14/2
OREGON STATE UNIV CORVALLIS
X BAND ESR CAVITY FOR STUDIES OF PARAMAGNETIC GASES,
by K. M. Evenson, and D. S. Burch. 27 Sep 65, 2p. Contract DA-ARO (D)-31-124-G791, AROD 3512:3
Unclassified report

Availability: Published in Review of Scientific Instruments v37 n2 p236-7 Feb 1966. Copies to DDC users only.

Descriptors: (*Gas analysis, Electron spin resonance), (*Electron spin resonance, Cavity resonators), (*Cavity resonators, X band), Design, Operation, Nitrogen, Oxygen, Recombination reactions

A cavity is described for use in an X band, 100 kHz modulation ESR (electron spin resonance) spectrometer which was specially constructed to measure atomic nitrogen densities for the determination of its volume recombination coefficient.

AD-632 370 Fld. 7/4, 20/12, 7/2
CFSTI Prices: HC $1.00 MF $0.50
SPINEDI (PAOLO) ROME (ITALY)
RESEARCH INTO THE CHEMICAL BEHAVIOUR OF SURFACES OF SINGLE-, BI- AND TRI-CRYSTALS UNDER DIFFERENT EXPERIMENTAL CONDITIONS.
Quarterly technical status rept. no. 2, 1 Oct-31 Dec 65,
31 Dec 65, 8p. Contract DA-91-591-EUC-3593,
Unclassified report

Descriptors: (*Crystals, *Ion bombardment), (*Reduction (Chemistry), Crystals), Surfaces, Oxides, Zinc, Cadmium, Tin, Bismuth, Germanium, Nucleation, Hydrogen, Single crystals, Etched crystals, Italy

Under preceding Contracts some studies on controlled oxidation of single-crystal surfaces had been carried out, the metals there considered being zinc, cadmium, tin, bismuth and germanium. Now, a first group of specimens of the said metals previously used in oxidation tests have been observed during their exposure to a hydrogen ion bombardment. In addition to a careful examination of the 'state' of the surface after such a long ageing at room temperature, the aim of such experiments was substantially to ascertain whether the hydrogen ion bombardment could give some data about the reducing mechanism of any surface distribution of oxide nuclei.

AD-632 438 Fld. 7/4
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
APPROACH TO SIMPLE EXPONENTIAL DECAY IN VIBRATIONAL RELAXATION,
by Tucker Carrington. 4 Mar 65, 9p.
ARL 65-273

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n2 p473-9 Jul 15 1965. Copies to DDC users only.

Descriptors: (*Relaxation time, *Molecular energy levels), (*Harmonic generators, Relaxation time), Vibration

When diatomic oscillators are dilutely dispersed in an inert heat bath, populations of the various vibrational levels in an initial nonequilibrium distribution relax toward thermal equilibrium with a time dependence that is a sum of terms like exp (lambda sub mt), where lambda sub 0 = 0, all other lambda sub m <0, and lambda sub m + 1 < lambda sub m. -1/lambda sub 1 ordinarily corresponds to the experimental relaxation time, since this term will dominate at long times. This work investigates cases in which the coefficient of the lambda sub 1 term, depending on the initial vibrational distribution and the heat-bath temperature, may vanish or be so small that the final simple exponential decay corresponding to lambda sub 1 is never reached under experimental conditions. For harmonic oscillators, if the initial distribution has its first n moments equal to the corresponding moments of the equilibrium distribution, then the first n coefficients in the sum of exponentials will be zero. Furthermore, there will be one or more values of the heat-bath temperature, independent of the initial distribution, for which the normally dominant exponential decay will be missing in the expression for the time dependence of population in any particular level. Some of these results can be extended qualitatively to anharmonic oscillators and more general systems. (Author)

AD-632 445 Fld. 7/4, 20/6
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF PHYSICS
EMISSIVITY OF WATER VAPOR AT 1200F K IN THE 1.9- AND 2.7-MICRONS REGIONS,
by A. Goldman, and U. P. Oppenheim. 15 Feb 65, 8p. Contract AF-EOAR-84-65, AFOSR 66-0346

Unclassified report

Availability: Published in Journal of the Optical Society of America v55 n7 p794-800 July 1965. Copies to DDC users only.

Descriptors: (*Water vapor, *Infrared spectroscopy), Emissivity, Spectra (Infrared), Quantum statistics, Mathematical models, Optics, Molecular spectroscopy

The emissivities of the two bands of water vapor at 1.9 and 2.7 microns were determined at elevated temperatures. Use was made of quartz absorption cells of various lengths, which were heated in an electrical furnace to a temperature of 1200K. By applying the 'statistical' spectral-band model at every frequency in lowkresolution spectra (8/cm), it was possible to obtain the band parameters x/L and 2 pi gamma (o)/d and thus to correlate the observed spectral absorptance with the optical path length and the pressure of the gas. From absorptance measurements in the 'linear region' the absolute intensity of the bands was derived. The total emissivity was calculated as a function of path length and pressure, and good agreement was obtained with direct observations of total emissivity at 1200K. (Author)

AD-632 523 Fld. 7/4, 9/2
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO
MACHINE COMPUTATION OF ESR SPECTRA.
Final rept., 15 Apr 65-1 Jan 66,
by L. A. Harrah, R. C. Waggoner, and D. J. Dunbar. Feb 66, 64p. Rept. no. AFML-TR-66-18, Proj. AF-7367, Task 736701,

Unclassified report

Descriptors: (*Electron spin resonance, Programming (Computers)), Spectroscopy, Hyperfine structure, Nuclear spins, Numerical analysis

Three computer programs are given for the calculation of theoretical ESR spectra with Mi variations in line width, up to six independent coupling constants, and combinations of two distinct species. Spectra are reported for the case of two identical nuclei of spin 1/2 and a second nonequivalent nucleus of spin 1/2 with varying line widths and changing ratios of the two coupling constants. (Author)

AD-632 559 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) DEPT OF PHYSICS
CONSECUTIVE ION-MOLECULE REACTIONS IN ETHYLENE INVESTIGATED BY MEANS OF POSITIVE ION-IMPACT,
by I. Szabo. 15 Feb 66, 35p. Rept. no. Scientific-5, Contract AF 61 (052)-762, Proj. AF-7635, Task 763504,
AFCRL 66-295

Unclassified report

Descriptors: (*Ethylenes, *Ion bombardment), Ions, Molecules, Chemical reactions, Exchange reactions, Mass spectrum, Dissociation, Reaction kinetics, Sweden

The ion-molecule reactions in ethylene (C2H4) were studied in detail up to fourth order processes in the pressure range 0.00008 to 0.0013 mm Hg. The intensities of the peaks are plotted as a function of the pressure. From the graph, the order and mechanisms of the formation of the product ions can be determined as a function of the energy absorbed by the molecule during the charge exchange. The ion-molecule reactions are discussed and some new processes are proposed. (Author)

AD-632 651 Fld. 7/4, 6/1, 7/2
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
ETUDE PHYSICO-CHEMIQUE DU PHOSPHATE TRICALCIQUE HYDRATE ET DE L'HYDROXYLAPATITE (STUDY OF THE PHYSICAL-CHEMISTRY OF HYDRATED TRICALCIUM PHOSPHATE AND HYDROXYAPATITE),
by L. Winand. 1961, 29p. Contract AF 61 (052)-268,AF 61 (514)-1175

Unclassified report

Text in French; Attached Summary in English.

Availability: Published in Annales de Chimie v6 (S13) p941-67 Sep-Oct 1961.

Descriptors: (*Calcium compounds, Phosphates), (*Phosphates, Physical chemistry), Thermogravimetric analysis, Differential thermal analysis, X-ray diffraction analysis, Infrared spectroscopy, Solubility, Heat treatment, Refractive index, Density, Molecular structure, Crystal lattice defects, Minerals, Bone, Belgium

Synthetic hydrated tricalcium phosphate (TCPH) and hydroxyapatite were compared by means of thermogravimetric methods, differential thermal analysis, X-ray diffraction and infra-red spectrometry. The solubility of both compounds in water and the structural modifications induced by thermal treatment were studied. Refractive index and density determinations were also performed to support some of the conclusions. It may be inferred from the experimental results that TCPH must be considered as a specific chemical entity which is different from hydroxyapatite. However, the molecular structures of these two compounds are closely similar; this conclusion fits with the observations which have already been made with X-ray diffraction method. The proposed formula of TCPH is: Ca9 (PO4-H . . .O4P) (PO4)4 (OH), which is well representative of a 'defect' structure, but is somewhat different from the formulas already pointed out for TCPH by other authors and also pertaining to the defect theory. (Author)

AD-631 992 See Fld. 20/9

AD-632 001 See Fld. 7/3

AD-632 022 See Fld. 20/5

AD-632 053 See Fld. 7/3

AD-632 103 See Fld. 10/2

AD-632 105 See Fld. 3/2

AD-632 129 See Fld. 9/1

AD-632 175 See Fld. 7/5

AD-632 176 See Fld. 7/5

AD-632 179 See Fld. 6/1

AD-632 180 See Fld. 6/1

AD-632 224 See Fld. 7/2

AD-632 258 See Fld. 20/8

AD-632 319 See Fld. 10/2

AD-632 334 See Fld. 20/12

AD-632 352 See Fld. 20/9

AD-632 377 See Fld. 20/3

AD-632 414 See Fld. 20/10

AD-632 416 See Fld. 20/5

AD-632 429 See Fld. 20/13

AD-632 430 See Fld. 20/12

AD-632 437 See Fld. 20/10

AD-632 439 See Fld. 21/8

AD-632 444 See Fld. 20/10

AD-632 591 See Fld. 7/3

AD-632 611 See Fld. 20/12

7/5. RADIO AND RADIATION CHEMISTRY

AD-631 931 Fld. 7/5
CFSTI Prices: HC $1.00 MF $0.50
MATERIALS SCIENCE CENTER CORNELL UNIV ITHACA N Y

TWO PHOTON SPECTROSCOPY IN ANTHRACENE.
Technical rept.,
by Dietmar Frohlich, and Herbert Mahr. 14 Apr 66, 13p. Rept. no. MSC-474,TR-6
Contract Nonr-401 (47)
Unclassified report

A Preliminary report of this work was given at the 1966 International Quantum Electronics Conference at Phoenix, Arizona. To be submitted to the Physical Review Letters.

Descriptors: (*Anthracenes, *Spectroscopy), Photons, Single crystals, Lasers, Flash lamps, Absorption spectrum, Light, Polarization, Atomic energy levels

AD-631 997 Fld. 7/5
CFSTI Prices: HC $3.00 MF $0.75
STATE UNIV OF NEW YORK STONY BROOK DEPT OF MATERIALS SCIENCE
THE THERMAL DECOMPOSITION OF IRRADIATED MATERIALS.
Technical rept.,
by Joseph Jach. 1 Mar 66, 92p. Rept. no. TR-2,
Contract Nonr-4673 (00), Task NR-056-467,
Unclassified report

Prepared for publication in 'Studies in Radiation Effects' Vol 2.

Descriptors: (*Radiation chemistry, *Decomposition), Azides, Oxalates, Permanganates, Bromates, Barium compounds, Lead compounds, Silver compounds, Nickel compounds, Mercury compounds, Explosive materials, Styphnates, Radiation damage, Dynamics, Heat of activation

A study was made of the influence of irradiation on the thermal decomposition of solid compounds. The article is divided into three sections. The first is a summary of present day knowledge of decompositions of unirradiated solids. These are the basic control experiments and the main purpose of this section is to familiarize the reader with the basic language of the field. The second section deals with the influence of irradiation itself, while the third section examines very briefly some related topics.

AD-632 058 Fld. 7/5
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
LASER DOUBLE-QUANTUM PHOTODETACHMENT OF I (-),
by J. L. Hall, E. J. Robinson, and L. M. Branscomb. 7 May 65, 4p. Contract DA-31-124-ARO (D)-139,
AROD 4445:39
Unclassified report

Supported in part by ARPA, proj. DEFENDER and NBS.

Availability: Published in Physical Review Letters v14 n25 p1013-6 Jun 21 1965. Copies to DDC users only.

Descriptors: (*Iodine, Photochemistry), (*Molecular beams, Photochemistry), (*Photochemistry, Lasers), Mass spectroscopy, Photons, Quantum statistics, Electrons

The results are reported of an experimental study of two-quantum induced photodetachment of electrons from a beam of negative ions of atomic iodine (I (-)) in high vacuum.

AD-632 063 Fld. 7/5, 7/2
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICAL CHEMISTRY
THE PHOTOCHEMISTRY OF N3 (-) IN AQUEOUS SOLUTION AT 254 MILLIMICRONS,
by I. Burak, and A. Treinin. 5 May 65, 6p. Contract DA-91-591-EUC-3583,
Unclassified report

Availability: Published in Journal of the American Chemical Society v87 n18 p4031-5 Sep 20 1965. Copies to DDC users only.

Descriptors: (*Nitrogen, *Photochemistry), Hydrazine, Ammonia, Amines, Hydroxides, Photolysis, Molecular energy levels, Imides, Israel

Irradiation of evacuated aqueous solutions of N3 (-) at 254 millimicrons leads to the production of N2, NH2OH, H2, N2H4, and NH3. At low N3 (-) concentration the photolysis has the following stoichiometry: N3 (-) + 2H2O + photon yields N2 + NH2OH + OH (-), and the quantum yield is 0.27. The quantum yields of N2 and NH2OH depend on the concentration of N3 (-) in a way that suggests a competition between N3 (-) and H2O in reacting with the same intermediate. The intermediate is probably the NH radical in its singlet state, produced by the reaction of excited N3 (-) with water. NH2OH is formed by the direct addition of NH to water. The effect of adding NH3 to the system was tested. The results indicate that NH3 scavenges the NH radical to form N2H4. The rate constants for scavenging of NH by H2O, NH3, and N3 (-) are in the following ratio: 1:18:285, respectively. The reaction of NH with N3 (-) is responsible for the formation of N2H4, H2, NH3, and further quantities of N2. The diimide molecule appears to play a prominent role here. The nature of the proposed reactions is discussed. (Author)

AD-632 066 Fld. 7/5, 20/5
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
MULTIPHOTON IONIZATION OF HYDROGEN AND RARE-GAS ATOMS,
by H. Barry Bebb, and Albert Gold. 8 Oct 65, 24p. Contract DA-31-124-ARO (D)-306,
AROD 5314:6
Unclassified report

Availability: Published in The Physical Review v143 n1 p1-24 Mar 4 1966. Copies to DDC users only.

Descriptors: (*Photolysis, Gas ionization), (*Hydrogen, Gas ionization), (*Helium group gases, Gas ionization), (*Gas ionization, Perturbation theory), Molecular beams, Lasers, Photons, Helium, Argon, Neon, Xenon, Krypton, Line spectrum, Electron transitions, Atomic energy levels, Selection rules

A perturbation theory of the ionization of atoms by simultaneous absorption of several photons, each of whose energy is less than the ionization potential, is developed from the evolution-operator formalism. A precise computation is made for the hydrogen atom, giving transition rates as a function of photon energy for two- through twelve-photon photoionization. The eighth-order ionization rate (in cgs units) at the 1.78-eV ruby-laser line is found to be approx. 10 to the -244 power X (photon flux) to the 8th power and should be observable using available techniques. Good agreement is obtained with Zernik's exact calculation of the two-photon ionization rate of metastable 2S hydrogen. Approximate calculations are made for the rare gases. Assuming 'typical' experimental conditions of a gas density of approx. 10 to the 20th power atoms 1Cu.Cm. and a ruby laser focused into a volume of approx. 10 to the -8th power /cu cm, we find that the flux required to liberate / electron during a 10-nsec pulse is approx. 10 to the 24th power /sq.cm./sec for Xe, Kr, and Ar and approx. 5 x 10 to the 30th power photons /sq.cm/sec for Ne and He. These gases ionize with the simultaneous absorption of 7,8,9,13, and 14 photons, respectively. The predicted rate for Xe is found to be in excellent agreement with the recent direct measurements of Voronov and Delone. It is concluded that multiphoton ionization provides the initial electrons required for the optical breakdown of gases, though it does not account for the overall growth of the discharge except possibly at very low pressures. Impurity atoms (particularly heavy rare gases) may be the source of 'initiating' electrons in Ne and He. (Author)

AD-632 175 Fld. 7/5, 7/4
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
RECOMBINATION AND DISPROPORTIONATION OF NH2 RADICALS,
by John D. Salzman, and Edward J. Bair. 13 Aug 64, 3p. Contract AF 49 (638)-1257, Proj. AF-9710, Task 971003,
AFOSR 66-0594
Unclassified report

Availability: Published in Journal of Chemical Physics v41 n11 p3654-5 December 1, 1964. Copies to DDC users only.

Descriptors: (*Ammonia, Photolysis), (*Free radicals, Amines), (*Recombination reactions, Amines), (*Disproportionation, Amines), Spectroscopy, Reaction kinetics, Low-pressure research, Hydrazine, Imines

New measurements of the ammonia decomposition reaction by flash photolysis with a multiple flash spectrum source are described. In the pressure range 0.000025 to 0.00005 moles/liter the rate of the NH3 disappearance is clearly dependent on the total concentration in agreement with Diesen's suggestion. An extrapolation of the observed rate constant to zero pressure should therefore be the rate of NH2 + NH3 to NH3 + NH; NH2 + NH2 to N2H4; should add a contribution to the observed rate which increases with pressure to a limiting high-pressure value for the sum of the two rates. (Author)

AD-632 176 Fld. 7/5, 7/4
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
DISTRIBUTION AND RELAXATION OF VIBRATIONALLY EXCITED OXYGEN IN FLASH PHOTOLYSIS OF OZONE,
by Robert V. Fitzsimmons, and Edward J. Bair. 24 Sep 63, 10p. Contract AF 49 (638)-1257, Proj. AF-9710, Task 971003,
AFOSR 66-0593
Unclassified report

Availability: Published in Journal of Chemical Physics v40 n2 p451-8 January 15, 1964. Copies to DDC users only.

Descriptors: (*Ozone, Photolysis), (*Oxygen, Band spectrum), Atomic energy levels, Spectroscopy, Excitation, Chemical bonds, Vibration, Relaxation time, Absorption spectrum, Intensity, Reaction kinetics, Distribution

Absolute absorption by a sequence of bands in the Schumann-Runge series arising from oxygen molecules in vibrationally excited levels of the ground state formed by secondary processes of the flash photolysis of ozone was measured as a function of time. Measurements of bands arising from states v double prime = 13 through v double prime = 19 are analyzed in terms of a continuously generated initial distribution which relaxes to room temperature in single quantum steps. The vibrational relaxation rate constants are large and are interpreted as an efficient transfer of vibrational energy between ozone and excited oxygen. The relaxation process is consistent with a single quantum step model, and if deviations from this model are real, they are secondary. Vibrationally excited oxygen is formed initially in all of the observed states. The analysis does not give the shape of the initial distribution, but in magnitude it is consistent with a normal distribution of the energy of the reaction in all of the available modes of motion. The absolute concentration of excited oxygen in vibrational states 17 and higher is relatively too small for these molecules to have a major role in the chemistry of ozone photolysis. (Author)

AD-632 220 Fld. 7/5, 11/7
CFSTI Prices: HC $4.60 MF $0.50
AMERICAN CYANAMID CO STAMFORD CONN CENTRAL RESEARCH DIV
CHEMILUMINESCENT MATERIALS.
Technical progress rept. no. 11, 1 Dec 65-28 Feb 66,
by M. M. Rauhut, L. J. Bollyky, D. R. Maulding, R. A. Clarke, and B. G. Roberts. 31 Mar 66, 50p. Rept. no. 06-1432-26-Q11,
Contract Nonr-4200 (00), ARPA Order-299 Task NR-356-452,
Unclassified report

See also AD-626 295.

Descriptors: (*Lighting equipment, Chemiluminescence), (*Chemiluminescence, Materials), (*Oxalates, Chemiluminescence), Amides, Synthesis (Chemistry), Intensity, Hydrogen peroxide, Anthracenes, Catalysis, pH, Nitrophenols, Photochemistry, Solvents, Concentration (Chemistry), Emissivity

Progress toward the development of efficient chemiluminescent systems is reported. Nine new oxalate esters and nine oxamides were prepared and examined qualitatively for chemiluminescence. Six of the esters and two oxamides gave medium or better chemiluminescent intensities when reacted with hydrogen peroxide and 9, 10-diphenylanthracene. Strong chemiluminescence was observed for two esters which represent new sub-classes of chemiluminescent oxalates. One of these requires acid catalysis and permits lifetime variation through pH control. A different, but partially overlapping, set of nine oxalate esters were examined quantitatively for chemiluminescence efficiency and lifetime in several solvents under a variety of conditions. Bis (2,4-dinitrophenyl) oxalate provided a quantum yield of 16.5% in dilute solution; five other esters gave quantum yields above 12%; and two others gave quantum yields in the 8 to 10% range. In every case, however, the quentum yield decreased with increasing ester concentration so that maximum radiation capacities were obttained at concentrations near 0.01 M. It was found that a large range of emission lifetimes can be achieved depending on the structure of the ester and the choice of reaction conditions. (Author)

AD-632 283 Fld. 7/5, 7/2, 8/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
PERMANGANATE AS A CESIUM PRECIPITANT. APPLICATION TO RADIOCHEMISTRY,
by William H. Shipman, and David Mueller. 11 May 66, 16p. Rept. no. USNRDL-TR-996,
Task 11275,
Unclassified report

Descriptors: (*Cesium, Chemical precipitation), (*Permanganates, Cesium compounds), (*Radiochemistry, Cesium), Ammonium compounds, Oceanography, Tracer studies, Radioactive isotopes

The coprecipitation of ammonium salts frequently occurs when cesium is determined gravimetrically. The use of cesium permanganate as the final precipitant is suggested, since ammonium permanganate is quite soluble and will not coprecipitate. (Author)

AD-632 463 Fld. 7/5, 7/2
CFSTI Prices: HC $3.00 MF $0.75
CARNEGIE INST OF TECH PITTSBURGH PA
'HOT' RADICAL REACTIONS IN FLASH PHOTOLYSIS.
Final annual rept.,
by J. Mains. 25 Apr 66, 94p. Contract AF-AFOSR-513k64, Proj. AF-9760, Task 976002, AFOSR 66-0727
Unclassified report

Descriptors: (*Photolysis, Free radicals), (*Free radicals, Chemical reactions), Hydrogen compounds, Iodides, Deuterated compounds, Hydrogenc Mercury, Germanium compoundsc HSYDRIDES, Propenes, Reaction kinetics, Halogenated hydrocarbons

The flash photolysis of hydrogen iodide in the presence of perdeutero-hydrocarbons was found to yield H2 and HD. The results were subjected to kinetic analysis. uthe effects of inert gas moderators were studied obtain/ng an indication of the extent to which non reactive collisions between 'hot' hydrogen atoms and these hydrocarbons are inelastic. The results obtained are consistant with those obtained in low intensity studies. The Hg (triplet-P1) photosensitized decomposition of GeH4 appears to proceed by rupture of a Ge-H bond. The H atoms formed in the primary process were found to be unscavengeable by 5 added propylene. It is proposed that the abstraction reaction, H+GeH4 to H2+GeH3, is very rapid and/or that the hydrogen atoms formed in the primary process carry some of the excess energy of the reaction. The rapid consumption of higher hydrides of germanium is partly attributed to their reactions with germyl radicals. The flash photolysis of methyl iodide was found to yield methane, ethane, ethylene, acetylene and iodine. The major mechanism of methane formation changes from low to high intensity increasing the quantum yield for methane production from 0.02 to 0.15. (Author)

AD-632 484 Fld. 7/5, 20/5, 19/4
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD AIR/GROUND EXPLOSIONS DIV
SOME EXPLORATORY EXPERIMENTS ON LASER EXPLOSIONS IN PSEUDO-AIR,
by T. W. Hill, and L. Rudlin. 1 Mar 66, 31p. Proj. NOL-907, Task NWER-01.002, NOLTR 65-152
Unclassified report

Descriptors: (*Lasers, *Photochemistry), (*Gases, Photochemistry), (*Air, Photochemistry), Explosions, Liquefied gases, Explosive gases, Nitrogen, Plasma medium, Water vapor, Salts, Excitation, Light pulses

A Q-switched ruby laser, which cannot explode air directly, has been used to explode various pseudo-air targets. These targets have been, generally, air with increased electron densities, such as a drop of liquid nitrogen or an air-plasma caused by a spark gap. Water drops, to which were added various salts, were also targets in evaluating the feasibility of salting targets. The results consisting of open-shutter photographs, time-integrated spectra, and some photodiode records with micro-second resolution suggest that: (1) twelve spectral lines are found common to nearly all the targets; identification suggests that these lines originate in the air surrounding the targets; (2) the structure of the spectrum resulting from laser interaction with a drop of liquid nitrogen has marked similarity to the structure of lightning spectra; further, most of the twelve lines common to nearly all spectra appear in lightning spectra; (3) the luminous phenomena occur over times like micro seconds from the laser pulses of duration like tens of nanoseconds; (4) further experiments with nanosecond-to-shake time resolution are needed to clarify the 'explosion' details. (Author)

AD-632 528 Fld. 7/5, 8/10, 18/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
CONCENTRATION OF STRONTIUM FROM SEAWATER BY MANGANESE DIOXIDE. DETERMINATION OF SR90 IN LARGE VOLUMES OF SEAWATER,
by William H. Shipman. 27 Feb 66, 17p. Rept. no. USNRDL-TR-995,
Proj. SF-111-01-03, Task 11275,
Unclassified report

Descriptors: (*Sea water, Radioactive isotopes), (*Strontium, Adsorption), (*Manganese compounds, Dioxides), Separation, Concentration (Chemistry), Radioactive fallout

The adsorption of strontium by hydrous manganese dioxide was used to concentrate strontium in seawater. The important parameters involved in this concentration process were studied. A complete radiochemical procedure is presented. (Author)

AD-632 024 **See Fld. 20/5**

AD-632 064 **See Fld. 7/4**

AD-632 112 **See Fld. 18/8**

AD-632 195 **See Fld. 6/1**

AD-632 356 **See Fld. 18/8**

AD-632 461 **See Fld. 21/9**

Field 8-EARTH SCIENCES AND OCEANOGRAPHY

8/2. CARTOGRAPHY

AD-631 837 **See Fld. 9/6**

AD-632 122 **See Fld. 14/5**

AD-632 365 **See Fld. 12/2**

8/3. DYNAMIC OCEANOGRAPHY

AD-632 010 Fld. 8/3, 15/1, 20/4
CFSTI Prices: HC $2.00 MF $0.50
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
INTERNAL WAVES: THEIR INFLUENCE UPON NAVAL OPERATIONS.
ASW sonar technology rept.
23 Feb 66, 32p. Rept. no. 4090266,
Contract NObsr-93055, Proj. SF-101-03-21, Task 11353,
Unclassified report

Descriptors: (*Ocean waves, *Hydrodynamics), (*Naval operations, Ocean waves), Sonar, Underwater sound, Sound transmission, Interference, Deep submergence, Submarines, Antisubmarine warfare, Atlantic Ocean, Pacific Ocean

Internal waves, traveling beneath the ocean surface with maximum amplitude at or near the pycnocline, have been observed in various areas of the oceans. This report reviews what is known concerning the generation, prevalence, and characteristics of internal waves, and summarizes available knowledge concerning the effects of internal waves on naval operations. Internal waves affect naval operations in two principal areas--depth control and detection capability. The passage of large-amplitude internal waves could make submarine depth control difficult, particularly when the submarine is running quietly at low speed. Perturbations caused by the internal wave could initiate uncontrollable sinking of a submarine without power if the submarine were more compressible than sea water. The detection capabilities of ASW systems are influenced by internal waves because the latter affect transmission of acoustic signals through the ocean. The principal effect in deep water is a significant change in sonar range during the few hours required for the passage of high-amplitude internal wave. In coastal waters, the fluctuations in sonar signal due to short-period waves are of an appropriate frequency to interfere with target holding. It appears that the magnitude of the fluctuations in one-way transmission between source and target may be as high as 10 db. (Author)

AD-632 294 Fld. 8/3, 20/4
CFSTI Prices: HC $2.00 MF $0.50
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
STUDIES OF TECHNIQUES FOR THE ANALYSIS AND PREDICTION OF TEMPERATURE IN THE OCEAN. PART IV: NUMERICAL FLOW PREDICTION WITH THE EQUIVALENT-BAROTROPIC MODEL.
Interim rept.,
by Geirmundur Arnason, and James G. Welsh.
Mar 66, 32p. Rept. no. 7421-208,
Contract N62306-1675,
Unclassified report

Descriptors: (*Ocean currents, Mathematical models), (*Gulf stream, Mathematical models), Atlantic Ocean, Ocean bottom topography, Two-dimensional flow, Oceanographic data, Maps, Fluid mechanics

The equivalent-barotropic model is formulated for an ocean with a fixed, uneven bottom and a free surface. The model is applied to predict the two-dimensional, vertically-integrated flow in a channel which includes the Gulf Stream from Cape Hatteras to the Grand Banks. By properly weighting the bottom topography in the model, meander patterns are formed which are similar to those observed. Examples of predictions by the model are shown and the results are discussed. (Author)

AD-632 018 See Fld. 8/7

8/5. GEODESY

AD-632 353 Fld. 8/5, 19/4
CFSTI Prices: HC $3.60 MF $0.50
AEROSPACE CORP SAN BERNARDINO CALIF
AN ESTIMATE OF THE UNCERTAINTY IN THE ADOPTED VALUE OF GRAVITY AT ABSOLUTE STATIONS.
Rept. for Oct 65-Mar 66,
by G. A. Reams, and A. J. Gregory. Mar 66, 36p. Rept. no. TR-669 (S6925-63)-1,
Contract AF 04 (695)-669,
BSD TR-66-117
Unclassified report

Descriptors: (*Gravity, Measurement), Uncertainty, Least squares method, Weapon systems, Ballistics, Guidance

A determination of the uncertainty in the magnitude of gravity assigned to various absolute stations is presented in this report. Accurate estimates of these uncertainties are essential in design and guidance accuracy studies for ballistic weapon systems. A review of the literature on absolute and relative gravity measurements has been performed. The findings of this review indicate that at present there is some doubt about the value of gravity to adopt for each of the absolute stations and a corresponding doubt concerning the uncertainty. Using published gravity data, various adjustments have been studied. The computational procedure used consists of a simultaneous determination of the value of gravity at each absolute station through a least-squares adjustment of the absolute and relative gravity observations. This procedure yields an adjusted value of gravity and an estimate of the uncertainty at each station. Estimates of uncertainty are computed assuming that the errors in the data are random and also assuming that part of the error is systematic. (Author)

AD-632 485 Fld. 8/5, 8/10
CFSTI Prices: HC $3.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
EXPERIMENTAL WORKS WITH A PENDULUM INSTRUMENT ABOARD THE SURFACE SHIP,
by B. M. Malakhov. 1966, 53p. Rept. no. TC-985,
TT 66-61223
Unclassified report

Opytnye Raboty na Nadvodnom Korable s Mayatnikovym Priborom, trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Geodezii, Aeros'emki i Kartografii. Trudy (USSR) v159 p29-59 1964.

Descriptors: (*Gravity, Measurement), (*Geodesics, Gravity), Shipborne, Dynamics, Statics, Geophysics, USSR, Meters, Reviews, Experimental data

The report discusses gravity measurements that could be carried out at sea by means of pendulums.

AD-632 496 Fld. 8/5, 17/7
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER GEODESY INTELLIGENCE AND MAPPING RESEARCH AND DEVELOPMENT AGENCY FORT BELVOIR VA
NEW METHOD FOR DETERMINING AZIMUTH AND LATITUDE INDEPENDENT OF TIME AND ZENITH DISTANCE.
Research note,
by Angel A. Baldini. Feb 66, 45p. Rept. no. GIMRADA-RN-17,
Proj. DA-4A014501A52C,
Unclassified report

Descriptors: (*Astronomical geodesics, *Position finding), Celestial navigation, Stars, Azimuth, Direction finding, Projective geometry

In this research note, a method for determining azimuth and latitude, independent of time and zenith distance is given. The solution is based on the recording of the horizontal circle readings when three or more different stars reach the same but unknown zenith distance. A minimum of three stars is required for the solution, and the time required for making the computation is less than 4 minutes. When more than three stars are observed at the same altitude, the set of independent equations is solved by the method of least squares. A detailed analysis of the errors upon azimuth and latitude is presented. (Author)

AD-632 548 Fld. 8/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
GEODETIC PRECISION IN ONE PERSPECTIVE.
Special repts.,
by Theodore E. Wirtanen. Apr 66, 10p. Rept. no. AFCRL-66-241,AFCRL-SP-43
Proj. AF-7600, Task 760006,
Unclassified report

Availability: Published in Journal of the Surveying and Mapping Division, ASCE v92 SU1 Proc. Paper 4600 p11-15 January 1966. Copies to DDC users only.

Descriptors: (*Geodesics, Measurement), Surveying, Satellites (Artificial), Guidance

Aero-space vehicle guidance systems with accuracies superior to the capabilities of conventional geodetic measuring techniques, are generating requirements for geodetic positioning information. In addition, as measuring techniques are developed that approach the desired results, the improvement in precision of measurement becomes limited by uncertainties in knowledge of environmental factors affecting measurement accuracy, i.e., atmospheric refraction. Geodetic experiments with specially instrumented satellites have already returned several types of significant, useful data, that compare favorably with existing geodetic information in positional accuracy and offer advantages in range of measurement. Such experimentation shows that artificial satellites can contribute to improved geodetic precision by extending range and areal coverage of measurements, and by offering methods for improving knowledge of the fundamental constants used in geodetic measurements. (Author)

AD-631 837 See Fld. 9/6

8/6. GEOGRAPHY

AD-631 868 Fld. 8/6
CFSTI Prices: HC $1.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL DEPT OF GEOGRAPHY
SOME COMMENTS ON CERTAIN TECHNICAL ASPECTS OF GEOGRAPHIC INFORMATION SYSTEMS.
Technical rept.,
by Michael F. Dacey, and Duane F. Marble. Dec 65, 15p. Rept. no. TR-2,
Contract Nonr-1228 (35), Proj. NR-389-142,
Unclassified report

Descriptors: (*Geography, *Information theory), Mapping, Language, Statistical processes

This document is intended to serve as a general preface to subsequent project reports of a more technical and specialized nature. Special attention is directed toward the work being carried on in the areas of spatial statistics and two-dimensional languages, and the relevance of this work to the development of generalized geographic information systems. (Author)

AD-632 586 Fld. 8/6
CFSTI Prices: HC $4.00 MF $0.75
DENVER UNIV COLO DEPT OF GEOGRAPHY
TRINCHERA DISTRIBUTION IN THE SIERRA MADRE OCCIDENTAL, MEXICO.
Final rept.,
by William A. Howard, and Thomas M. Griffiths.
Apr 66, 104p. Rept. no. Pubs. in Geography-66-1,DRI-2321
Contract DA-19-129-AMC-789 (N), Proj. DA-1V025001A129,
Unclassified report

See also AD-614441.

Descriptors: (*Geography, *Mexico), Terrain, Geology, Archaeology, Climatology, Plants (Botany), Soils, Irrigation systems, Dams

Trincheras are primitive dams or walls built of local rock. They occur widely throughout northern Mexico and extend into southwestern United States. They are associated with Indian habitation sites and are of two distinct types. The Sonoran-type trincheras most commonly appear encircling the tops of isolated peaks and are believed to have been crude fortifications. The Sierra-type trincheras are found principally across dry stream courses and are believed to have been built to retain water and/or soil. This paper discusses both types as they occur in or near the Sierra Madre Occidental and describes their distribution, archeological associations, and relationship to the physical geography of the region. (Author)

8/7. GEOLOGY AND MINERALOGY

AD-632 018 Fld. 8/7, 8/10, 8/3
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
OCEANOGRAPHIC RESEARCH AT M.I.T. IN THE DEPARTMENT OF GEOLOGY AND GEOPHYSICS AND THE DEPARTMENT OF METEOROLOGY.
Progress rept. no. 4, 1 Jan-31 Dec 65.
Feb 66, 22p. Contract Nonr-1841 (74), Proj. NR-083-157,
Unclassified report

Descriptors: (*Oceanology, Bibliographies), (*Geology, Bibliographies), (*Meteorology, Bibliographies), Massachusetts, Universities,

Research program administration, Symposia, Abstracts, Geochemistry, Geophysics

AD-632 202 Fld. 8/7
CFSTI Prices: HC $6.00 MF $1.25
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
TECTONICS OF SIBERIA. VOLUME II. TECTONICS OF THE KRASNOYAR KRAY,
by I. V. Luchitskii. 1966, 264p. Rept. no. TC-955,
TT 66-61192

Unclassified report

Trans. of mono. Tektonika Sibiri. Tom II. Tektonika Krasnoyarskogo Kraya, Novosibirsk, 1963 385p.

Descriptors: (*Structural geology, Siberia), (*Orogeny, Siberia), Dynamics, Geology, Faults (Geology), Folds (Geology), Stratigraphy, Maps, USSR

AD-632 412 Fld. 8/7
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
TRANSLATED ABSTRACTS OF ARTICLES.
1966, 6p. Rept. no. Emm-65-46 (a),
Contract AF 19 (628)-5073,

Unclassified report

Trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) v14 n1 p1-72 1965.

Descriptors: (*Geophysics, China), Geology, Atmosphere, Seismology, Terrestrial magnetism, Mapping, Abstracts

Seven abstracts of papers pertaining to various aspects of geology and geophysics are included.

AD-631 904 **See Fld. 6/1**

AD-631 970 **See Fld. 3/2**

AD-632 172 **See Fld. 8/11**

AD-632 486 **See Fld. 8/10**

8/8. HYDROGLOGY AND LIMNOLOGY

AD-631 948 Fld. 8/8
CFSTI Prices: HC $2.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N.H
HYDROLOGIC STUDIES OF THE GLENN CREEK DRAINAGE BASIN NEAR FAIRBANKS, ALASKA.
Special rept., (Preliminary rept.),
by S. Lawrence Dingman. Feb 66, 35p. Rept. no. SR-86,
Proj. DA-1V014501B52A02,

Unclassified report

Descriptors: (*Hydrology, *Alaska), Rivers, Drainage, Climatology, Permafrost, Sedimentation, Graphics, Geography

The following observations and tentative conclusions are based on the first summer's study of Glenn Creek and its drainage basin: (1) relationships comprising at-a-station hydraulic geometry are similar to those for larger streams in other areas; (2) the lag time between rainfall and peak storm discharge is much longer for Glenn Creek than for similar-sized streams in mid-latitude regions; (3) hydrograph recessions are drawn out in time relative to those for similar-sized streams in mid-latitude regions; (4) base flow was low in early and mid-summer, rose to a peak in late summer, and very gradually diminished thereafter, accounting for most of the flow in September and October; (5) direct runoff must occur largely as interflow; (6) about 24% of the rain which fell appeared as runoff; (7) the fraction of rainfall appearing as direct runoff varied from 3% to 30%, and showed no seasonal trends; () the suspended and dissolved sediment concentrations of Glenn Creek are within the ranges reported for larger streams in the area; (9) suspended sediment yield was roughly five times as large as dissolved sediment yield for June-October. A number of years of study will be required to confirm these preliminary conclusions and to determine the representativeness of the observations. (Author)

8/10. PHYSICAL OCEANOGRAPHY

AD-632 008 Fld. 8/10, 13/10, 15/1
CFSTI Prices: HC $3.00 MF $0.50
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
EXPERIMENTAL EVALUATION OF EXPENDABLE BATHYTHERMOGRAPHS.
ASW Sonar technology rept.
Nov 65, 56p. Rept. no. 4071165,
Contract NObsr-93055, Proj. SF-101-03-21, Task 11353,

Unclassified report

Descriptors: (*Bathythermographs, Naval research), Antisubmarine warfare, Sonar, Oceanographic equipment, Oceans, Temperature, Measurement, Performance (Engineering), Statistical analysis, Marine engineering

To measure the vertical ocean temperature profile, the U. S. Navy developed a mechanical bathythermograph (MBT) before World War II. Although the MBT has many deficiencies, it has been modified only slightly and is still in general use. Because difficulties have been encountered with the MBT, the Navy is seeking a new BT that will be more suitable for use aboard ASW and other vessels and that will improve the sonar range prediction capability of the fleet. In particular, the Navy is evaluating several versions of low-cost expendable bathythermographs (XBT) for its tactical forces. This report describes the results of a series of experiments performed to evaluate the accuracy, precision, and reliability of XBT's produced in the latter half of calendar year 1964 by the following three manufacturers: Francis Associates, Bissett-Berman, and Packard Electric. The test program was under the management of U. S. Navy, Underwater Sound Laboratory, New London, Connecticut. (Author)

AD-632 486 Fld. 8/10, 8/7, 8/11
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
SOME DATA ON GEOLOGICAL STRUCTURE OF THE NORTHWESTERN PART OF THE BLACK SEA,
by I. A. Garkalenko, L. B. Bogayevskii, and D. B. Bezverkhov. 1966, 19p. Rept. no. TC-999-C, TT 66-61224

Unclassified report

Nekotorye Dannye o Geologicheskom Stroenii Severo -Zapadnoi Chasti Chernogo Morya, trans. of Geofizicheskii Sbornik (USSR) v8 n10 p44-8 1964.

Descriptors: (*Black Sea, *Marine geology), (*Geophysical prospecting, Black Sea), Marine geophysics, Seismic waves, Underwater explosions, Structural geology, USSR

Marine seismic prospecting operations, employing the reflection method, were conducted. The aim of these marine explorations was to study the seismological conditions and the structural forms in the Tertiary and Cretaceous deposits. The observations were carried out on a rarefied network of reconnaissance profiles.

AD-632 530 Fld. 8/10
CFSTI Prices: HC $1.00 MF $0.50
SCRIPPS INSTITUTION OF OCEANOGRAPHY LA JOLLA CALIF
WORLD-WIDE OCEAN DEPTHS AND CONTINENTAL ELEVATIONS AVERAGED FOR AREAS APPROXIMATING ONE DEGREE SQUARES OF LATITUDE AND LONGITUDE,
by Stuart M. Smith, H. W. Menard, and George Sharman. Mar 66, 15p. Rept. no. SIO Ref-65-8, Contract Nonr-2216 (12),

Unclassified report

Descriptors: (*Hydrographic surveying, *Ocean bottom topography), Oceanology, Marine geology, Depth finding, Height finding, Terrain, Oceanographic data, Mapping, Oceans

This report provides background information on a world-wide set of ocean depths and land elevations recently compiled in meters and averaged over areas roughly equivalent to one degree squares of latitude and longitude at the equator. Averaging was done by visual estimation from contour charts having scales ranging between 1:1 and 1:25 million with contour intervals of 1000 meters or 200 fathoms. A description of the source charts, square referencing, averaging methods, error checks and estimates, is included.

AD-632 018 **See Fld. 8/7**

AD-632 099 **See Fld. 20/1**

AD-632 156 **See Fld. 8/11**

AD-632 283 **See Fld. 7/5**

AD-632 284 **See Fld. 18/4**

AD-632 485 **See Fld. 8/5**

AD-632 528 **See Fld. 7/5**

8/11. SEISMOLOGY

AD-631 847 Fld. 8/11, 17/10
CFSTI Prices: HC $3.00 MF $0.50
HAWAII INST OF GEOPHYSICS HONOLULU
EARTHQUAKE EPICENTER DETERMINATION USING DELTA T DATA,
by George Pararas-Carayannis, and James Sasser. Dec 65, 52p. Rept. no. HIG-65-16,
Contract Nonr-3748 (01) ,Nonr-3748 (03)

Unclassified report

Descriptors: (*Earthquakes, Epicenter), (*Epicenter, Position finding), (*Seismology, *Position finding), Seismic waves, Propagation, Curve fitting, Trigonometry, Programming (Computers), Marine geophysics, Pacific Ocean, Seismological stations

Theoretical time differences in the arrival of P-waves at different seismic stations around the Pacific were compiled and plotted by digital computer and by hand. Time-difference curves were plotted for each pair of seismic stations; such curves will allow the quick determination of earthquake epicenters. The following seismic stations were used in the compilations: Honolulu, Hawaii; Tucson, Arizona; Hong Kong; College, Alaska; and Sitka, Alaska. Included in this report is a modified version of the spherical hyperbola program that was used in the compilation. Travel-time difference charts are included as appendices for all combinations of the seismic stations listed above. (Author)

AD-631 935 Fld. 8/11
CFSTI Prices: HC $6.00 MF $1.25
COAST AND GEODETIC SURVEY WASHINGTON D C

EARTHQUAKES IN THE UNITED STATES 1963-64 AND AN EVALUATION OF THE DETECTION CAPABILITY OF THE UNITED STATES SEISMOGRAPH STATIONS.
Final rept.,
by J. C. Stepp, W. A. Rinehart, and S. T. Algermissen. 16 Nov 65, 248p. Contract ARPA Order-620, Task 5b,

Unclassified report

Descriptors: (*Earthquakes, United States), (*Seismological stations, United States), (*Seismology, Earthquakes), Epicenter, Intensity, Position finding, Statistical data, Seismographs, Sensitivity

This study is based on earthquakes reported on the Preliminary Determination of Epicenter (P.D.E.) cards of the Coast and Geodetic Survey. Four types of presentations are made: (1) a chronological list of earthquakes: (2) a magnitude map showing the geographical distribution of earthquakes whose magnitudes are greater than, or equal to, 3.0; (3) a presentation of frequency versus magnitude for the total United States for and individual regions of high seismicity; and (4) a 'seismicity' map giving a quantitative measure of relative seismic activity.

AD-632 146 Fld. 8/11, 17/10, 9/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
LARGE APERTURE SEISMIC ARRAY SIGNAL HANDLING SYSTEM,
by R. V. Wood Jr., R. G. Enticknap, C. S. Lin, and R. M. Martinson. 29 Sep 65, 9p. Rept. no. JA-2643,
Contract AF 19 (628)-5167,ARPA Order-512
ESD TDR-66-53

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p1844-51 Dec 1965. Copies to DDC users only.

Descriptors: (*Seismometers, Networks), (*Seismology, *Data processing systems), (*Seismological stations, Instrumentation), Site selection, Communication systems, Electronic recording systems, Systems engineering, Montana, Nuclear explosions, Earthquakes, Detection, Underwater explosion

The complexity and location of the Large Aperture Seismic Array (LASA) pose difficult problems for the system designer. This paper discusses the features of the array, the problems presented, and the solutions chosen to meet them. The location of an array such as LASA is dictated by seismic considerations. Those criteria which affect system design and their implications are discussed with regard to several major components of the system, the signal collection, the communications, the signal recording, and the array control. In the case of the Montana LASA, only a very short time was available for its implementation. This had a major influence on component choice and system design, but did not compromise either the performance or reliability of the system. (Author)

AD-632 147 Fld. 8/11, 17/10, 9/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
DATA RECORDING AND PROCESSING FOR THE EXPERIMENTAL LARGE APERTURE SEISMIC ARRAY,
by H. W. Briscoe, and P. L. Fleck. 24 Sep 65, 9p. Rept. no. JA-2649,
Contract AF 19 (628)-5167,
ESD TDR-66-54

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p1852-9 Dec 1965. Copies to DDC users only.

Descriptors: (*Seismometers, Networks), (*Seismology, *Data processing systems), (*Seismological stations, Instrumentation), Site selection, Communication systems, Seismic waves, Electronic recording systems, Nuclear explosions, Earthquakes, Detection, Underground explosions

The high resolution of the Large Aperture Seismic Array (LASA) and the volume of data it produces makes many of the recording and processing techniques used for the earlier Vela arrays impractical, obsolete, or both. In this paper, the history of processing for seismic arrays is briefly reviewed, and the recording and processing requirements of the LASA in contrast to past arrays are summarized. Both the on-line use of the LASA for detection of seismic disturbances and the off-line processing of the data for signal analysis are centered around the use of high-speed digital processing equipment. The on-line processing facilities at the LASA Data Center are described, and the current effort to evaluate processing techniques for use with LASA is discussed. (Author)

AD-632 150 Fld. 8/11, 17/10, 9/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
PRINCIPLES OF AN EXPERIMENTAL LARGE APERTURE SEISMIC ARRAY (LASA),
by P. E. Green Jr., R. A. Frosch, and C. F. Romney. 24 Sep 65, 12p. Rept. no. JA-2651,
Contract AF 19 (628)-5167,ARPA Order-512
ESD TDR-66-55

Unclassified report

Prepared in cooperation with AFTAC.

Availability: Published in Proceedins of the IEEE v53 n12 p1821-33 Dec 1965. Copies to DDC users only.

Descriptors: (*Seismometers, Networks), (*Seismology, Data processing systems), (*Seismological stations, Instrumentation), Site selection, Communication systems, Seismic waves, Electronic recording systems, Nuclear explosions, Earthquakes, Detection, Underground explosions

One of the most useful techniques for improving capability to observe small remote seismic events is to connect a large number of seismic sensors distributed in the horizontal plane so as to form an array. This has proved to be of great interest in seismological research and is particularly useful in the monitoring of underground nuclear tests, since the events are of small magnitude and the criteria used to distinguish source type depend on freeing the weak signal as far as possible from additive microseismic noise, reverberation components, and interfering earthquake activity that might chance to occur simultaneously. Results achieved by the use of seismic arrays of several kilometers aperture and several tens of sensors were sufficiently promising to suggest that substantial further improvements might be expected from an even larger array having more than an order of magnitude greater aperture and number of sensors. Such a Large Aperture Seismic Array (LASA) has been built and is being evaluated. The number of sensors is 525 and the aperture is 200 km. (Author)

AD-632 156 Fld. 8/11, 8/10
CFSTI Prices: HC $2.60 MF $0.50
HAWAII INST OF GEOPHYSICS HONOLULU
T-PHASE RADIATORS IN THE WESTERN ALEUTIANS.
Technical summary rept.,
by Rockne H. Johnson, and Roger A. Norris. Mar 66, 24p. Rept. no. HIG-66-4,
Contract Nonr-3748 (01),Order-218-62-3 Proj. 8100,

Unclassified report

Descriptors: (*Earthquakes, *Pacific ocean), (*Seismology, Pacific ocean), Marine geophysics, Epicenter, Seismic waves, Propagation, Measurement, Hydrophones, Aleutian Islands

The aftershocks of the Rat Islands earthquake of 4 February 1965 provided a large volume of data for processing with a T-phase source location program. Although the earthquake epicenters were somewhat uniformly distributed through the Rat and Near Islands region, the computed T-phase sources were grouped in six clusters along the Aleutian arc. The clusters are considered to represent radiation from distinct sites along the Aleutian ridge. These sites are evidently submarine promontories which, due to their exposure, radiate energy over broader arcs of the Pacific than do intervening regions. The relationship of T-phase strength to earthquake magnitude varied little among these radiators; however, T-phases from sources south of the Aleutian trench were significantly weaker. Identification of the arrivals from separate radiators in the signal from the main shock allowed an estimation of the length and velocity of the faulting. The estimate was 500 km and 3.5 km/sec. (Author)

AD-632 157 Fld. 8/11
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
TOTAL ENERGY AND ENERGY SPECTRAL DENSITY OF ELASTIC WAVE RADIATION FROM PROPAGATING FAULTS. PART II. A STATISTICAL SOURCE MODEL.
Environmental research papers,
by N. A. Haskell. Apr 66, 20p. Rept. no. AFCRL-ERP-186,AFCRL-65-123-2
Proj. AF-7639, Task 763902,

Unclassified report

Availability: Published in Bulletin of the Seismological Society of America v56 n1 p125-40 Feb 1966. Copies to DDC users only.

Descriptors: (*Seismic waves, Propagation), (*Earthquaker, *Faults (Geology)), (*Seismology, Faults (Geology)), Statistical data, Mathematical models

Previously derived expressions for the total energy and spectral density of elastic waves radiated by a propagating fault are rewritten in terms of a spacio-temporal autocorrelation of the acceleration of relative displacement over the fault plane. This is interpreted in a statistical sense as the average autocorrelation over an ensemble of earthquakes. An explicit form of autocorrelation function is assumed, depending upon two parameters, a correlation length, and a correlation time, and the total energy and energy spectral density are derived in terms of these parameters. By using scaling laws due to Bath and Duda for earthquake volume and radiation efficiency as functions of magnitude, the statistical parameters may also be related to magnitude. (Author)

AD-632 172 Fld. 8/11, 8/7
RHODE ISLAND UNIV KINGSTON
SEISMIC REFRACTION AT CRUSTAL DISCONTINUITIES.
Annual rept., 1 Jan-31 Dec 65,
by Julius Kane. 19 Apr 66, 29p. Contract AF 19 (628)-319,ARPA Order-180-62 Proj. 8100,3810 Task 2,

Unclassified report

Descriptors: (*Seismology, Numerical methods and procedures), (*Seismic waves, Propagation), Lithosphere, Structural geology, Mechanical waves, Diffraction, Integrals, Differential equations, Geophysics

Contents: Travel time and phase shift; the theory of surface wave diffraction by symmetric crustal discontinuities; and integrals of the second-order linear differential equation.

AD-632 453 Fld. 8/11, 17/10
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C

RESEARCH IN SEISMOLOGY.
1965, 92p. Rept. no. AFOSR-65-2667.
Unclassified report

Rept. on VELA Uniform Program.

Descriptors: (*Seismology, Bibliographies), (*Detection, Seismology), Nuclear explosions, Earthquakes, Seismic waves, Identification systems, Geology, Geophysics, Research program administration

A program of basic research in seismology was carried out to improve the capability to distinguish seismically between nuclear explosions and natural geological events. Research efforts were applied in areas of identification techniques, data processing, array configurat/on, deep-hole and ocean bottom detection, instrumentation techniques, magnitude-energy scale relationships, noise studies, earth seismicity, explosion and earthquake source mechanism studies, crustal studies, and theoretical studies. This report presents summaries of the accomplishments of those efforts funded to date. The summaries were prepared by grantee and contractor research personnel.

AD-632 486 See Fld. 8/10

8/12. SNOW, ICE, AND PERMAFROST

AD-631 949 Fld. 8/12, 13/2, 13/6, 15/5
CFSTI Prices: HC $2.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
SUBSURFACE TRANSPORTATION METHODS IN DEEP SNOW.
Technical rept.,
by Gunars Abele. Dec 65, 50p. Rept. no. TR-160,
Proj. DA-1V025001A13001.
Unclassified report

Descriptors: (*Snow, *Trafficability), (*Transportation, Arctic regions), Underground structures, Roads, Railroads, Vehicles, Mobility, Friction, Rubber, Vehicle wheels, Greenland, Feasibility studies, Civil engineering

During the 1962 test season in Greenland, a study was performed on subsurface transportation methods. A 1600 ft long, covered test trench containing horizontal curves and a 400 ft long processed snow floor section was constructed. Wheel trafficability tests on the snow trench floor were conducted with two types of low-pressure tires as well as with standard truck tires. An M-54 5-ton truck with a 5-ton load was used as the test vehicle. Skid tests were performed with the three types of tires on the processed snow floor, and the coefficient of friction between the tires and a hard snow surface was determined. A 1300 ft long, standard gage railroad track was installed in the trench after completion of the wheel traffic tests. A standard size flatcar with a 30-ton load, towed by a 5-ton truck equipped with rail wheels, was used as the test vehicle for the rail traffic tests. It was determined that the natural, unprocessed snow surface in a trench 26 ft below the snow surface is not suitable for extensive traffjc with vehicles such as 5-ton trucks even when equipped with low-pressure flotation tires. However, a Peter plow-processed, age-hardened snow surface is capable of supporting a virtually unlimited amount of vehicle traffic using standard tires. Indications are that even heavier wheeled vehicles could be easily supported by a processed-snow trench floor. The coefficient of friction between rubber tires and a hard snow surface was found to be in the general range of 0.2 to 0.3. (Author)

AD-632 357 Fld. 8/12
CFSTI Prices: HC $2.60 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
THE ELASTIC CONSTANTS, STRENGTH AND DENSITY OF GREENLAND SNOW AS DETERMINED FROM MEASUREMENTS OF SONIC WAVE VELOCITY.
Technical rept.,
by James L. Smith. Nov 65, 25p. Rept. no. TR-167,
Task DA-IV025001A13001.
Unclassified report

Descriptors: (*Snow, Mechanical properties), Acoustics, Piezoelectric transducers, Geophysics, Exploration, Ice

The measurement of sonic wave velocities on undisturbed samples of Greenland snow was accomplished using piezo-electric transducers in conjunction with a soniscope which provided the exciting source and the time measuring device. These velocity measurements were correlated with density determinations, crushing strength tests, and the elastic constants of the Greenland snow samples for a density range of 0.4 to 0.9 g/cc. Empirical formulae were derived that present the density, crushing strength, and the elastic constants as functions of sonic wave velocity. (Author)

AD-632 198 See Fld. 13/13

8/13. SOIL MECHANICS

AD-632 061 Fld. 8/13
CFSTI Prices: HC $3.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CIVIL ENGINEERING
QUANTITATIVE FABRIC OF CONSOLIDATED KAOLINITE.
Phase rept. no. 4 on Research in earth physics (Research rept.),
by R. Torrence Martin. Sep 65, 82p. Rept. no. R65-47,
Contract DA-22-079-eng-330, Proj. DA-1-V-0-14501-B-52A-30 ,DA-1-V-0-21701-A-046-05
AEWES CR-3-101
Unclassified report

See also 625 871.

Descriptors: (*Kaolinite, X-ray diffraction analysis), (*Clay, Soil mechanics), Particles, Clay minerals, Force (Mechanics), Moisture

Structure is the combination of the geometrical arrangement of particles and the forces operating between them. The geometrical arrangement of particles and associated voids is called fabric and is the component of structure that is most amenable to measurement. Since the structure concept has been invoked to explain so many features of clay behavior, a reliable quantitative method for determining the fabric of a moist clay is extremely important. A method is described for quantitatively expressing orientation of kaolinite particles in a wet clay mass. Wet clay is impregnated with a polyalcohol which permits grinding of a very flat surface (without disrupting the original fabric) for quantitative X-ray measurement. In the specific procedure discussed, a Norelco diffractometer equipped with a pole figure device and a Gieger detector was employed to measure by reflection the diffracted intensity of the 002 and 020 kaolinite reflections. The amplitude of the 002 peak to the amplitude of the 020 peak is called the Peak Ratio, PR, which quantitatively expresses particle orientation at any chosen angle to the specimen surface. For the kaolinite investigated, fabric varied from random to maximum orientation. (Author)

AD-632 080 Fld. 8/13, 14/2, 20/13
CFSTI Prices: HC $6.00 MF $1.50
VIRGINIA POLYTECHNIC INST BLACKSBURG
THE DEVELOPMENT, FABRICATION, AND EVALUATION OF A DEVICE FOR THE MEASUREMENT OF THERMAL PROPERTIES OF SOIL.
Final rept., Jun 64-Jan 66,
by S. T. Hsu, and H. S. Kao. Jan 66, 250p. Contract NBy-32275, Proj. Y-F011-05-02-341,
Unclassified report

Descriptors: (*Soil mechanics, *Thermometers), Soils, Thermal conductivity, Thermal diffusion, Probes, Temperature sensitive elements, Mechanical drawings, Performance (Engineering), Tables

Statement of the Problem: (a) To design, develop, fabricate and evaluate a probe device embodying the line heat source concept for the in situ measurement of the thermal conductivities of soils; (b) to develop and evaluate the technique, using the probe device, for measuring the thermal conductivities of soils in situ; (c) to design, develop, fabricate, and evaluate a heated disk device based upon the contact principle for the in situ determination of the thermal diffusivities of soils; (d) to develop and evaluate the technique, using the heated disk, for measuring the thermal diffusivities of soils in situ. (Author)

AD-632 106 Fld. 8/13, 20/1, 18/3
CFSTI Prices: HC $5.00 MF $1.00
STANFORD RESEARCH INST MENLO PARK CALIF
ONE-DIMENSIONAL STRESS WAVE PROPAGATION IN SOILS.
Final rept. Sep 64-Dec 65,
by Lynn Seaman. Feb 66, 175p. Contract DA-49-146-XZ-343, Proj. SR1-PHU-5184,
DASA 1757
Unclassified report

Descriptors: (*Acoustics, Soil mechanics), (*Soil mechanics, *Shock waves), Soils, Sand, Clay, Mechanical waves, Propagation, One-dimensional flow, Stresses, Strain (Mechanics), Loading (Mechanics), Explosion effects, Nuclear explosions, Mathematical prediction, Compressive properties, Underground structures

Soil behavior during stress wave propagation was studied on a sand and two clays by making one-dimensional wave propagation tests on 5-meter long columns of the soils. Attempts were made to predict this behavior by determining soil properties in dynamic compression tests on small samples and by using these properties in a variety of mathematical models for soils. In all the wave propagation tests, stress and acceleration records were very similar, showing that the three soils differ in degree, not in kind. Peak stress and particle velocity attenuated to 20-40% of the peak value in the length of the 5-meter column. Two theoretical soil models were analyzed: one to investigate the effect of combined time-dependent and time-independent dissipation, and one to study the effects of nonlinear stress-strain relations and geostatic stress. Comparison of the theoretical predictions from the first of these and two previously studied models (using properties obtained from compression tests on soil samples) with the wave propagation results shows: (1) For clays the arrival time of the wave at the column base was within 10% of that calculated from the tangent modulus, and for sand it was within 25%. (2) Attenuation of peak stress and particle velocity was predicted within plus or minus 50% at the base of the column (5-meter length). (Author)

AD-632 245 Fld. 8/13, 13/6
CFSTI Prices:MF $0.75
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
PERFORMANCE OF SOILS UNDER TIRE LOADS: ANALYSIS OF TESTS IN SAND FROM SEPTEMBER 1962 THROUGH NOVEMBER 1963.
Technical rept., Rept. no. 4,
by Gerald W. Turnage, and Andrew J. Green Jr.,
Feb 66, 102p. Rept. no. TR-3-666-4,
Proj. DA-1-V-O-21701-A-046, Task 03,
Unclassified report

See also AD-631 029.

Availability: Hard copy available from Army Engineer Waterways Experiment Station, Vicksburg, Miss., $1.00.

Descriptors: (*Tires, *Mobility), (*Soil mechanics, Trafficability), (*Sand, Trafficability), Laboratories, Tests, Soils, Desert, Silt, Experimental data, Graphics

This report examines the effects of tire deflection, tread, carcass stiffness, construction, speed, and slip on tire performance in a dry sand. Laboratory tests results indicate that for best performance in a dry sand a tire should be highly deflected, smooth, and of diagonal-ply construction. Variations in carcass stiffness have negligible effects on tire performance when comparisons are made at equal loads and deflections. It was concluded that the performance of pneumatic tires in sand is affected by speed; however, the extent of this influence was not wholly determined. Logical, orderly relations are shown between slip and several independent and dependent variables--wheel load, soil strength, pull, and sinkage--both at the towed and the maximum pull points. A direct relation is shown between the pull developed by a full-scale 4x4 vehicle and that developed by a single wheel in multiple passes. Good agreement was attained in this relation for both Yuma (desert) and mortar sand. Significant differences in tire performance registered in Yuma and mortar sands at corresponding levels of soil strength (as measured by cone index) prompted a study of the physical characteristics of the two soils. This study revealed notable differences in the strength characteristics of Yuma and mortar sands that explain a portion of the differences in tire performance in the two sands. (Author)

AD-632 354 Fld. 8/13
CFSTI Prices: MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CIVIL ENGINEERING
TWO-DIMENSIONAL ANALYSIS OF STRESS AND STRAIN IN SOILS. REPORT I. ITERATION PROCEDURE FOR SATURATED ELASTIC POROUS MATERIAL.
Research rept.,
by John T. Christian. Jun 65, 51p. Rept. no. RR-R65-46, Soils Pub-184
Contract DA-22-079-eng-427,
AEWES CR-3-129-1

Unclassified report

Availability: Army Engineer Waterways Experiment Station, Vicksburg, Miss., HC/$0.75.

Descriptors: (*Soil mechanics, Programming (Computers)), (*Stresses, Soil mechanics), (*Strain (Mechanics), Soil mechanics), Elasticity, Porous materials, Fluid mechanics, Iterative methods, Civil engineering

A program for the IBM 7040 computer was developed to provide the stress and displacement fields for an elastic porous material under conditions of plane strain with rectangular boundaries and force or displacement controlled loading. The program uses a lumped parameter model of the material and solves the problem by an iterative technique. Options are provided for solving drained cases, in which volume change occurs and no pore pressures develop, and undrained cases, in which no volume change occurs and pore pressures do develop. The output includes a listing of force, stress, and displacement fields and a graphical array of normalized stress fields for total stresses, effective stresses, and pore pressures. The results of a sample problem are shown. (Author)

8/14. TERRESTRIAL MAGNETISM

AD-631 833 Fld. 8/14, 4/1
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
THE ANALYTIC DESCRIPTION OF THE GEOMAGNETIC FIELD AT SATELLITE ALTITUDES,
by F. T. Heuring. Apr 64, 25p. Rept. no. TG-568,
Contract NOw-62-0604-c,

Unclassified report

Descriptors: (*Terrestrial magnetism, *Upper atmosphere), Scientific satellites, Orbital trajectories, Harmonic analysis, Magnetic fields

The Vanguard III scalar magnetic values were compared to values of the geomagnetic intensity as computed using various sets of harmonic coefficients (ten in all). The procedure followed was to compute both the arithmetic mean and the ratio of the rms difference (computed intensity minus observed intensity) to the rms of the observed intensity. The latter calculations were made as a function, sequentially, of the number of harmonic coefficients so as to assess the contribution each coefficient made to the total geomagnetic intensity. Results are that not only can a 'best' set of harmonic coefficients be proferred for describing the geomagnetic intensity at satellite altitudes but also a minimum number of coefficients depending on the accuracy desired. Also pinpointed were harmonic coefficients in need of revision, and an estimate of 10-26 gammas can be made for the maximum contribution to the magnetic intensity by external sources. (Author)

AD-632 259 Fld. 8/14, 4/1
CFSTI Prices: HC $1.00 MF $0.50
DIRECTORATE OF SCIENTIFIC INFORMATION SERVICES OTTAWA (ONTARIO)
PULSATIONS OF BEAT TYPE IN THE ELECTROMAGNETIC FIELD OF THE EARTH (ACCORDING TO OBSERVATIONS AT IRKUTSK),
by P. A. Vinogradov. Feb 66, 14p. Rept. no. T-443-R,
TT 66-61196

Unclassified report

Trans. of Geologiya i Geofizika (USSR) n11 p114-24 1962.

Descriptors: (*Terrestrial magnetism, Oscillation), Ionospheric disturbances, Magnetic storms, Geophysics, USSR

The report discusses beat-type pulsations (Pearl Pulsations) in the terrestrial electromagnetic field, and the relationship between the excitation of these pulsations and certain electromagnetic phenomena in the upper atmosphere. The results presented were obtained on the basis of four years of observation.

Field 9-ELECTRONICS AND ELECTRICAL ENGINEERING

9/1. COMPONENTS

AD-631 841 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
INVESTIGATION OF NOISE IN MAGNETRON INJECTION GUNS.
Technical rept.,
by Paul Fischer. Mar 66, 24p. Rept. no. ECOM-2690,
Proj. DA-1L0-13001-A-91A, Task 1L0-13001-A-91A-17,

Unclassified report

Descriptors: (*Magnetrons, *Electron guns), Injection, Cathodes (Electron tubes), Electric fields, Space charges, Klystrons, X band, Electron beams, Focusing

A space-charge flow for the magnetron injection gun has been derived which includes the effect of a constant electric field parallel to the cathode. The analysis indicates that the introduction of such a field in a magnetron injection gun will reduce electron back-bombardment of the cathode and improve beam laminarity. Back-bombardment and nonlaminarity are deleterious to the useful operation of magnetron injection guns, which are often needed for incorporation in high-power microwave tubes. (Author)

AD-631 875 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
THIN-FILM METAL-BASE TRIODES.
Research rept., May-Nov 65,
by B. D. Evans. 15 Feb 66, 46p. Rept. no. NEL-1356,
Proj. SR-001-01-01, Task 0401,

Unclassified report

Descriptors: (*Triodes, Metal films), Aluminum, Aluminum compounds, Oxides, Diodes (Semiconductor), Tunneling (Electronics)

An experimental and theoretical study of an aluminum-aluminum oxide-aluminum triode showed it to have active-device characteristics equivalent to those of two diodes back-to-back. The phenomena involved can be explained in terms of tunnel emission. The report includes a survey of the literature, and proposals for investigation of other thin-film metal-base triodes of various structures and compositions. (Author)

AD-631 955 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
THE EFFECT OF ANNEALING THIN FILM CAPACITORS,
by W. M. McGuire. 27 Apr 65, 17p. Rept. no. NAFI-TR-536,

Unclassified report

Descriptors: (*Capacitors, Films), (*Ceramic capacitors, *Annealing), Silicon compounds, Monoxides, Dielectric films, Substrates, Resistance (Electrical), Capacitance

An annealing treatment upon thin film capacitors using silicon monoxide (SiO) as the dielectric will significantly increase the d-c resistance and decrease the capacitive dissipation of good thin film capacitors. However, initially inferior capacitors generally do not show improvement after annealing. (Author)

AD-632 005 Fld. 9/1, 9/5
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ELECTRIC CO SYRACUSE N Y ELECTRONICS LAB
X-BAND TUNNEL DIODES FOR PHASED ARRAY RADAR.
Quarterly progress rept. no. 3, 14 Dec 65-14 Mar 66,
by C. W. Lee, D. H. Kortkamp, and M. Chronis. 14 Mar 66, 40p. Contract NObsr-89328, Proj. SR-008-03-01,

Unclassified report

See also AD-602 771.

Descriptors: (*Tunnel diodes, *Phased arrays), X band, Radar antennas, Push-pull amplifiers, Germanium, Diodes (Semiconductor), Sandwich construction, Silicon compounds, Oxides

A push-pull amplifier has been built using a pair of 1.8 ma Germanium diodes. The amplifier has successfully demonstrated the improvement of the dynamic range by a factor 10 db over a single diode amplifier. The amplifier has been operated

at a gain of 11 to 13 db with absolute stability and without degrading the noise figure. Work continued on the fabrication of 1.8 ma peak current tunnel diodes in the miniaturized pill package using a new lead design. Use of the new lead design improves the ease of fabrication and testing of the tunnel diodes and reduces slightly the minimum inductance of the miniaturized pill package. Fabrication of 9 ma peak current tunnel diodes in the same package was begun. Pairs of both 1.8 ma and 9 ma peak current were fabricated into 3.6 ma and 18 ma peak current push-pull tunnel diode devices. Various modifications have been made in the inverse sandwich tunnel diode design in an attempt to solve some of the problems which exist. These changes were both in processing and in basic pellet structure. (Author)

AD-632 028 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
EVALUATION OF STANDARD ALUMINUM ELECTRODE THIN FILM CAPACITORS.
Technical rept.,
by W. McGuire. 17 May 65, 16p. Rept. no. NAFI-TR-557,

Unclassified report

Descriptors: (*Capacitors, *Films), Aluminum, Electrodes, Ceramic capacitors, Annealing, Silicon compounds, Monoxides, Dielectric films, Resistance (Electrical), Capacitance

The report shows that the characteristics of thin film capacitors utilizing aluminum electrodes and SiO dielectrics can be improved by annealing at 450C. Some indication is given to the effects of various process parameters during dielectric deposition and supports the general concensus that consistently good thin film capacitors are rather difficult to fabricate. (Author)

AD-632 079 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
GENERAL INSTRUMENT CORP DARLINGTON S C CAPACITOR DIV
PRODUCTION ENGINEERING MEASURE FOR THE IMPROVED RELIABILITY OF CAPACITORS, FIXED, SOLID ELECTROLYTE, TANTALUM HIGH-RELIABILITY 100 MFD-20 VOLT CAPACITORS.
Quarterly rept. no. 9, 29 Jun-28 Sep 65,
by Floyd R. Banks,Jr., and A. DiGiacomo. 28 Sep 65, 21p. Contract DA-36-039-AMC-03622 (E)

Unclassified report

See also AD-619 081.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Fixed capacitors, Binders, Processing, Sintering, Reliability (Electronics), Aging (Materials), Anodes, Pyrolysis, Coatings, Carbon, Silver, Quality control, Life expectancy, Performance (Engineering)

A concise statement is presented of the work performed during this reporting period. Combined process improvement studies reported include: (1) the conditions for the pre-pilot line test run; (2) anodizing and ageing; (3) re-forming, carbon coatings, and ageing; and (4) tantalum powder, binder, and ageing. The design objectives of three dipping machines are described; they are for the manganous nitrate, collodial graphite, and silver-paste dipping stages of the processing. These machines were developed independently of the contract but are now in use under the contract to incorporate into it the best state-of-the-Art developments. Similarly, new encapsulation fixtures have been designed and put into operation independently of the contract; they, too, are under evaluation for the contract as part of the process improvement program. A formal reliability-oriented training program is discussed briefly. Technical conclusions are given along with the quarterly progress percentage calculations and the program for the next quarter. (Author)

AD-632 093 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
LABORATORY EVALUATION OF FIELD AND ASSAULT CABLE.
Technical rept.,
by T. Ferris Scoville. Feb 66, 20p. Proj. DA-1P6-22001-A057, Task 1P6-22001-A057-07, ECOM 2657

Unclassified report

Descriptors: (*Electric cables, Tests), (*Field wire, Electric insulation), Telephone lines

Due to the introduction by industry of new and improved insulation materials it was decided to investigate the possibility of substituting a single insulation in place of the present polyethylene-nylon combination used on Field Wire WD-1/TT. This could result in a lighter, smaller, and cheaper cable. Quantities of cables insulated with hi-density polyethylene were obtained, made up into a twisted pair the same as WD-1/TT and also in a parallel pair construction. The result of laboratory test indicates that either would make a good replacement for standard WD-1/TT with the parallel pair having slightly better characteristics in several instances. Further work is to be done which will include electrical evaluation after local field conditioning and dispenser payout tests. Concurrently with this program, quantities of the new Canadian Assault cable were tested in the laboratory to supplement USATECOM tests (CE 1663). The cable was found suitable for partial replacement of WD-1/TT in temporary assault applications. The cable has been nomenclatured WD -36 ( )/TT and classified Standard 'A' for its intended use. (Author)

AD-632 129 Fld. 9/1, 7/4, 20/3
CFSTI Prices: HC $1.60 MF $0.50
LIEGE UNIV (BELGIUM) DEPT OF ASTROPHYSICS
DEVELOPMENT OF A HEATED GRAPHITE HOLLOW -CATHODE DISCHARGE TUBE FOR THE STUDY OF MOLECULAR SPECTRA.
Technical note,
by Francois Remy. 20 Dec 65, 17p. Rept. no. TN-11,
Contract AF 61 (052)-587,
AFCRL 66-220

Unclassified report

Descriptors: (*Cathodes, *Discharge tubes), (*Glow discharges, *Molecular spectroscopy), Graphite, Electrodes, Electric discharges, Carbon compounds, Spectroscopy, Astrophysics

The first part of this report points out the principal references giving this way a survey of the numerous fields of application of the hollow-cathode discharge. The second part is devoted to the description of a hollow-cathode discharge the cathode of which is a heated graphite furnace. This installation was developed with the aim of bringing some contribution to the knowledge of carbonaceous molecules of special interest for astrophysics. (Author)

AD-632 133 Fld. 9/1
CFSTI Prices: HC $1.10 MF $0.50
WATKINS-JOHNSON CO PALO ALTO CALIF
STUDY OF DISTORTION IN KLYSTRONS AND TRAVELING-WAVE TUBES.
Final rept., 1 Jun 63-31 May 65,
by William Kunz. 31 May 65, 8p. Contract DA-36-039-AMC-02321 (E), Proj. DA-1P6-22001-A-055-04,
ECOM 02321-F

Unclassified report

Descriptors: (*Klystrons, Distortion), (*Traveling -wave tubes, Distortion)

This report describes the work accomplished during the eight quarter of this study of distortion in klystrons and traveling-wave tubes. In addition it contains a detailed summary of the significant findings of the study over its completed span. Experimental results are presented indicating that no significant variation in distortion under two-tone saturated drive is found over an extremely wide selection of operating parameters in conventional traveling-wave tubes. A severed helix tube design, however, did show significant performance improvement in regard to distortion suppression. Possible future avenues of approach to the distortion problem in the light of these findings are discussed. (Author)

AD-632 141 Fld. 9/1
CFSTI Prices: HC $4.60 MF $0.50
RADIO CORP OF AMERICA CAMDEN N J DEFENSE ELECTRONIC PRODUCTS
HIGH PERFORMANCE THIN FILMS FOR MICROCIRCUITS (CAPACITORS).
Quarterly progress rept. no. 3, 1 Sep-30 Nov 65,
by Franz Huber, and W. Witt. 31 Mar 66, 46p.
Rept. no. CR-65-419-32,
Contract DA-28-043-AMC-01230 (E), Proj. DA-1CO-24401-A-348-00-53,
ECOM 01230-3

Unclassified report

See also AD-628 130.

Descriptors: (*Capacitors, *Thin film storage devices), (*Microminiaturization (Electronics), *Circuits), Films, Hafnium compounds, Dioxides, Deposition, Sputtering, Anodic coatings, Capacitance, Dielectric films, Thickness, Processing

Thin-film capacitors consisting of hafnium - hafnium dioxide were fabricated and evaluated. The hafnium film is deposited onto a passive substrate by cathodic sputtering. A rate of deposition of 330 A/min permits the deposition of hafnium films with a specific resistivity of about 100 micro ohm-cm. The dielectric hafnium dioxide is produced by wet and plasma anodization. Experiments show that forming of the oxide film by plasma anodization is limited to a forming voltage (V sub f) of about 60 volts as compared to 250 volts for the wet anodization process. Preliminary measurements on the dielectric constant by the 'wedge' technique show a k of 45. The temperature coefficient of capacitance for wet-anodized samples has been found to be +125 ppm/degrees C between -196C and 350C. Measurements on the frequency dependence show that the capacitance decreases by only 3 percent at 300 kHz as compared to the 1 kHz values. Preliminary life tests at +125C show that thin-film hafnium - hafnium dioxide capacitors prepared by wet anodization exhibit a high stability as compared to plasmionically-anodized hafnium -oxide thin-film capacitors. (Author)

AD-632 152 Fld. 9/1, 20/12, 18/8
LINCOLN LAB MASS INST OF TECH LEXINGTON
EFFECT OF ELECTRON IRRADIATION ON N-CHANNEL MOS TRANSISTORS,
by Alan G. Stanley. 28 Oct 65, 2p. Rept. no. JA-2683,
Contract AF 19 (628)-5167,
ESD TDR-66-151

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p2150 Dec 1965. Copies to DDC users only.

Descriptors: (*Transistors, Radiation damage), Silicon, Metals, Oxides, Electron bombardment

N-channel MOS transistors were irradiated with 1.5 MeV electrons under negative gate bias. At a saturation dose of 3 X 10 to the 14th power el sq cm the radiation produced a negative shift of 2 to 3V in the gate turn-on voltage and an increase

in source-to -drain leakage current by two orders of magnitude. On storing the irradiated devices will all terminals shorted, a dead short developed between gate and body which could be removed by passing current across the short. (Author)

AD-632 229 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
CORNELL-DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO NORWOOD MASS
PRODUCTION ENGINEERING MEASURE FOR THE PRODUCTION OF SILICON MONOXIDE CAPACITORS MICROELEMENT.
Quarterly rept. no. 11, 1 Dec 65-28 Feb 66,
by Welville B. Nowak. 28 Feb 66, 16p. Contract DA-36-039-AMC-01478 (E),
Unclassified report

See also AD-623 395.

Descriptors: (*Capacitors, Manufacturing methods), (*Silicon compounds, Ceramic capacitors), Monoxides, Microminiaturization (Electronics), Life expectancy, Performance (Engineering), Modules (Electronics)

Groups A and B acceptance testing were completed for the pilot production of each type of microelement: 560, 180, 100, and 68 pf. Group C testing has been initiated. Process improvements have increased recent yields to approximately 90%. Future production problems would be re-use of the SiO source material over multiple runs, and cleaning of the Edwards quartz crystals after six or seven Al-SiO-Al cycles. (Author)

AD-632 232 Fld. 9/1, 9/5
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
COOLED AND UNCOOLED VARACTORS FOR PARAMP APPLICATIONS.
Technical note,
by F. J. Dominick. 5 Apr 66, 28p. Rept. no. TN-1966-27,
Contract AF 19 (628)-5167, Proj. AF-649L,
ESD TDR-66-160
Unclassified report

Descriptors: (*Varactor diodes, *Parametric amplifiers), Low-temperature research, Cryogenics, Diffusion, Silicon, Germanium, Gallium alloys, Indium alloys, Arsenic alloys, Indium alloys, Antimony alloys, Intermetallic compounds

A discussion of the properties needed to obtain high-quality varactors is presented. Test data are also presented on state-of-the-art varactors as they are cooled from room temperature (290K) to liquid helium temperature A (4.2K). (Author)

AD-632 246 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL FLEET MISSILE SYSTEMS ANALYSIS AND EVALUATION GROUP CORONA CALIF
MEASUREMENT OF MICROWAVE DELAY LINE LENGTH.
Technical rept.,
by J. J. Hoote. 3 Jan 66, 24p.
NAVWEPS 9079
Unclassified report

Descriptors: (*Delay lines, Measurement), Microwave equipment, Waveguides, Test methods, X band reflection, Phase (Electronics)

Two techniques for electrically measuring microwave waveguide delay lines are presented in this report. These two methods, depending on reflection and phase cancellation phenomena, permit accurate determination of delay line length with equipment commonly found in the microwave laboratory. A table has been included for X-band waveguide which minimizes the arithmetic required in utilizing the methods. (Author)

AD-632 335 Fld. 9/1, 17/9
CFSTI Prices: HC $3.00 MF $0.75
HUGHES AIRCRAFT CO FULLERTON CALIF
MICROMINIATURIZATION MULTIPLANE INTERCONNECTIONS.
Progress rept. no. 2, 1 Oct-31 Dec 65,
by William T. Rhoades. Apr 66, 81p. Rept. no. FR-66-11-115,
Contract DA-28-043-AMC-01439 (E), Proj. DA-1P6-22001-A-057, Task 1P6-22001-A-057-03, ECOM 01439-2
Unclassified report

Descriptors: (*Circuit interconnections, *Microminiaturization (Electronics)), (*Modules (Electronic), Microminiaturization (Electronics)), Capacitance, Electrical impedance, Reliability (Electronics), Gates (Circuits), Radar equipment

The purpose of this work is the development of interconnections for ultra-high-speed MICRO-CIRCUIT MODULE ARRAYS. The MCM passive crosstalk analysis and measurements are presented. From these results, the MCM must use matched lines with characteristic impedances below 400 ohms if crosstalk is to be below 10% over the frequencies of interest. Progress on the subassembly and assembly designs is described. Various delay measurements on the ultra-high-speed gate, show that the system delay will be below 5 nanoseconds, if less than plus or minus 15% change in line impedance is maintained. Thermal resistance from circuit to case has been analyzed, and with the present chip size (40 x 40 mils) it will be below 13 C/W. (Author)

AD-632 340 Fld. 9/1, 14/4
CFSTI Prices: HC $3.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
LIFE EXPECTANCY OF A NEW MINIATURE POWER RELAY.
Technical rept.,
by William J. Fontana. Mar 66, 56p. Rept. no. ECOM-2672,
Proj. DA-1P6-22001-A057, Task 1P6-22001-A057-01-06,
Unclassified report

Descriptors: (*Electronic relays, Miniature electronic equipment), Life expectancy, Power, Reliability (Electronics), Statistical analysis, Factor analysis

The report describes a Laboratory-conducted program wherein a new miniature power relay design was subjected to a series of life tests to develop its life expectancy profile under a broad range of electrical operating conditions. The principle of factorial experimentation was applied to develop a test program which, over the relay's design range of resistive load conditions, operating temperatures, and operating rates, would provide useful data at minimum cost. From the resulting statistical analysis, a series of functional relationships between the relay life expectancy and the operating stress levels were developed. Mathematical and graphical representations of these relationships are given for use by design engineers in estimating the life expectancy, or reliability, of the relay under specific operating conditions. In addition, the curves can be used to estimate the effect which 'trading off' specific operating parameters can have on the expected reliable life of the relay. (Author)

AD-632 363 Fld. 9/1, 13/8
CFSTI Prices: HC $5.00 MF $1.00
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR-COMPONENTS DIV
PRODUCTION ENGINEERING MEASURE (PEM) FOR TRANSISTOR, PNP, SILICON, SWITCHING TYPE EL-2N (X-12).
Quarterly rept. no. 3, 25 Sep-25 Dec 65,
by Larry Lands. Mar 66, 157p. Rept. no. 03-66-28,
Contract DA-36-039-AMC-06160 (E),
Unclassified report

See also AD 628 128.

Descriptors: (*Transistors, Manufacturing methods), Silicon, Gain, Performance (Engineering), Films, Reliability (Electronics), Leakage (Electrical)

The third engineering samples exhibited significant improvement in current gain performance and cutoff frequency over previous samples. Typical performance of h sub FE at VCE = 0.5 V and IC = 10 mA was in the 45-50 range (specification minimum = 30). Absolute value of h sub fe performance was greater than 20 dB in most cases. The test conditions for absolute value of h sub fe was modified from I sub C = 10 mA to I sub C = 2 mA, which allowed the measurement to be made near the peak operation point of the device. Units were fabricated on very thin, low resistivity epitaxial films. The material produced a V sub CE (sat) distribution between 0.17 and 0.20 V. Breakdowns were marginal and in many cases were governed by punch through considerations and not avalanche effects. Switching times were about the same for delay time and storage time; however, the increased h sub FE and absolute value of h sub fe produced a rise time of 4.6 ns and a fall time of 4.8 ns. A large group of units were processed and the data analyzed by an IBM 1440 computer. Parameter variation curves with bias and temperature plotted from this data and furnish an accurate picture of the device capabilities. Preliminary reliability tests were conducted and indicated a problem area with storage life samples. (Author)

AD-632 390 Fld. 9/1, 9/2
CFSTI Prices: HC $4.00 MF $1.00
HUGHES AIRCRAFT CO FULLERTON CALIF
MICROMINIATURIZATION MULTIPLANE INTERCONNECTIONS.
Quarterly technical progress rept. no. 1, 1 Jul-30 Sep 65,
by William T. Rhoades. Apr 66, 141p. Contract DA-28-043-AMC-01439 (E), Proj. DA-1P6-22001-A057, Task 03,
ECOM 01439-1
Unclassified report

Descriptors: (*Microminiaturization (Electronics), *Circuit interconnections), (*Modules (Electronics), Microminiaturization (Electronics)), Packaging, Gates (Circuits), Computer logic, Transmission lines, Integrated circuits, Performance (Engineering), Thermal properties

The purpose of this work is the development of interconnections for ultrahigh-speed-Micro-Circuit Module arrays. Four module packaging approaches for ultra high speed circuits, along with a new packaging technique, are presented and compared. High complexity arrays are discussed and analyzed from the viewpoint of cost and performance. Progress on the subassembly and assembly and assembly designs is described. Various power requirements and delay measurements on the ultra-high-speed gate are given. (Author)

AD-632 420 Fld. 9/1, 9/5
CFSTI Prices: HC $3.00 MF $1.00
ELECTRONIC FILMS INC BURLINGTON MASS
LOW COST MICROCIRCUIT NETWORKS.
Final rept. 1 Jul 64-31 Dec 65,
by W. MacDonald. 31 Dec 65, 66p. Contract DA-28-043-AMC-00284 (E), Proj. DA-1P6-22001-A-057, Task 1P6-22001-A-057 03,
ECOM 00284-F
Unclassified report

See also AD-623 314.

Descriptors: (*Resistors, Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Circuits), Films, Amplifiers, Capacitors, Life expectancy, Dielectrics, Silicon compounds, Monoxides, Resistance (Electrical), Costs

The first step was a study of the factors that effect thin film circuit density. The study resulted in a list of rules for microcircuit resistor network design that were used to design a differential amplifier circuit that demonstrates the degree of circuit complexity that can be achieved on a 0.310 x 0.310 inch square wafer. This phase of the development program concluded with the fabrication of fifty differential amplifier circuits that were electrically tested and analyzed to verify the results of the circuit design study. The second step was the fabrication of 2000 resistor boards. A cost analysis of the production run demonstrated that the per resistor cost on the 0.310 x 0.310 wafer can be as low as 3.75 cents per resistor. The third step was the development of two types of thin film capacitors - one containing a silicon monoxide dielectric, the second containing a photoresist dielectric. The two capacitor types were manufactured in a limited quantity (100 units). The cost per capacitor of 22 cents has been set for the 0.310 inch wafer size. A life test program was run on 50 resistor networks and 50 capacitor networks to demonstrate the load life capability. (Author)

AD-632 421 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
PIEZO TECHNOLOGY INC ORLANDO FLA
PEM FOR FILTERS, UPPER SIDEBAND, (1.75 MC) QUARTZ CRYSTALS TYPE EL-FR (X-1).
Quarterly progress rept. no. 4, 1 Apr-30 Dec 65,
by K. W. Callahan, and W. H. Horton. 30 Dec 65, 22p. Contract DA-36-039-AMC-03636 (E),
Unclassified report

See also AD-618 104.

Descriptors: (*Crystal filters, Manufacturing methods), (*Quartz, Radiofrequency filters), Medium frequency, Performance (Engineering), Band-pass filters, Capacitance, Sidebands, Temperature

Pre-production crystal filters were fabricated through this period and are rady for acceptance testing. Response characteristics of these filters are discussed. Some difficulty has been encountered with spurious responses. (Author)

AD-632 441 Fld. 9/1
CFSTI Prices: HC $4.00 MF $0.75
SPERRY RAND RESEARCH CENTER SUDBURY MASS
HIGH-GAIN LOW-NOISE PHOTODETECTORS.
Scientific rept. 1 Apr 65-31 Mar 66,
by H. Kroger. Apr 66, 117p. Rept. no. SRRC-CR-66-13,
Contract N600 (19)63823,
Unclassified report

See also AD-610 824.

Descriptors: (*Photoelectric cells (Semiconductor), *Demodulators), (*Parametric amplifiers, Photoelectric cells (Semiconductor)), (*Avalanche diodes, Performance (Engineering)), Signal-to-noise ratio, Silicon, Modulation, Noise (Radio), Diodes (Semiconductor), Grain, Microwave frequency, Scanning, Light, Spectrum analyzers, Electrolytic polishing, Space charges

The object was the development and evaluation of wide band p-n junction photodetectors which have the capability of internal modes of amplification. Photodiodes which make use of avalanche multiplication have been fabricated and their behavior studied in detail. The avalanche photodiode compares favorably with the photoparametric diode with regard to both net amplification and attainable signal-to-noise ratio for many applications. Avalanche gain of 45 dB has been observed for modulation frequencies near 1 GHz in silicon photodiodes. The avalanche photodiodes are shot-noise-limited detectors, even for modest values of multiplication (M squared of 5 to 20). The shot-noise available power of the avalanche photodiodes varied approximately as M squared. The reasons for this dependence are not completely clear; they could involve both space-charge-induced 'smoothing' of avalanche noise as well as the fact that the ionization coefficients of holes and electrons are quite different (by an order of magnitude) in silicon. (Author)

AD-632 468 Fld. 9/1, 9/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
NUMERICAL ANALYSIS OF PIERCE-TYPE ELECTRON GUNS,
by Richard T. Close. 4 Apr 66, 22p. Rept. no. NRL-6384,
Proj. RR-002-01-41-4904,
Unclassified report

Descriptors: (*Numerical analysis, *Electron guns), Programming (Computers), Design, Electron beams

Digital-computer programs have been used to analyze four Pierce-type electron guns. The numerical analysis has been very successful in identifying the deficiencies of the Pierce-design method when extrapolated to high perveances. It also has been possible to obtain radial phase-space diagrams for the beams from each of the electron guns studied. From these diagrams and by the use of several other computer programs, an estimate of the transverse energy distribution of the electron beams has been made. It has been found that the major contribution to the random transverse energy must be of nonthermal origin. (Author)

AD-632 556 Fld. 9/1, 20/12
CFSTI Prices: HC $7.00 MF $1.75
RESEARCH TRIANGLE INST DURHAM NC
INTEGRATED SILICON DEVICE TECHNOLOGY. VOLUME XI. BIPOLAR TRANSISTORS.
Rept. for Mar-Oct 65,
by J. R. Hauser. Apr 66, 359p. Contract AF 33 (615)-1998, Proj. AF-4159, Task 415906, ASD TDR-63-316-Vol-11
Unclassified report

See also AD-626 985.

Descriptors: (*Transistors, *Integrated circuits), (*Silicon, Integrated circuits), Theory, Electric currents, Performance (Engineering), Design, Electronics, Doping, Field theory, Equations

Both bipolar transistor theory and the characteristics and design of transistors in integrated circuits are discussed. The discussion of transistor theory includes not only the conventional transistor models of uniformly doped emitter, base, and collector regions and of constant electric field in the base (exponential impurity doping in the base) but also includes models for general impurity profiles in the emitter, base, and collector regions. Both small signal models and large signal models are discussed. High current phenomena including high injection and emitter crowding phenomena are considered. Effects which are important at low currents are also discussed. These are generation-recombination effects in junction depletion regions and phenomena associated with surface space charge layers. Numerical examples are presented throughout the volume to illustrate the various models developed and discussed. With the exception of grounded emitter current gain, transistor parameters can be fairly well correlated with theory. In addition to general transistor theory, the characteristics and design of transistors in integrated circuits are discussed. This includes a discussion of typical transistor structures, isolation problems, topological design, multiple transistor structures, and the differences between discrete and integrated transistors. Design examples are included to illustrate the factors discussed. A small number of typical uses of transistors in integrated circuits are included. (Author)

AD-631 959 See Fld. 20/3

AD-631 972 See Fld. 14/4

AD-632 103 See Fld. 10/2

AD-632 112 See Fld. 18/8

AD-632 223 See Fld. 20/12

AD-632 312 See Fld. 20/3

AD-632 344 See Fld. 17/9

AD-632 364 See Fld. 13/8

AD-632 537 See Fld. 9/5

9/2. COMPUTERS

AD-631 839 Fld. 9/2, 12/2
CFSTI Prices: HC $1.00 MF $0.50
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
OPTIMAL ASSIGMENT OF COMPUTER STORAGE BY CHAIN DECOMPOSITION OF PARTIALLY ORDERED SETS.
Research rept.,
by George B. Dantzig, and Gary H. Reynolds. Mar 66, 13p. Rept. no. ORC-66-6,
Contract Nonr-222 (83),PHS-GM-9606 Proj. NR-047-033,
Unclassified report

Descriptors: (*Optimization, *Data storage systems), (*Set theory, Programming (Computers)), Control sequences

To save storage, a program is usually written so that each variable assumes several values. As a result, a program is usually difficult to understand and prone to errors. For an important class of programs, it will be shown that they can be written with complete freedom in the naming of variables; leaving the task of minimizing storage requirements to the computer itself. (Author)

AD-631 853 Fld. 9/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SCHEME OF REMULTIPLICATION ARRANGEMENT USING THE MEASURING METHOD OF INSTANTANEOUS VALUES OF MAGNITUDES.
by I. M. Vitenberg, and A. I. Kozlova. 30 Mar 66, 12p. Rept. no. FTD-TT-65-1493, TT 66-61134
Unclassified report

Unedited rough draft trans. of mono. Voprósy Vychislitelnoi Matematiki i Vychislitelnoi Tekhniki, Moscow, 1963 p331-5.

Descriptors: (*Digital computers, Pulse counters), Design, USSR

AD-631 860 Fld. 9/2, 12/1
CFSTI Prices: HC $1.00 MF $0.50
HEBREW UNIV JERUSALEM (ISRAEL)
ULTIMATE-DEFINITE AND SYMMETRIC -DEFINITE EVENTS AND AUTOMATA.
Technical rept.,
by A. Paz, and B. Peleg. Feb 65, 25p. Rept. no. TR-17,
Contract N62558-3882, Proj. NR-049-130,
Unclassified report

Prepared in cooperation with Technion - Israel Inst. of Tech., Haifa.

Descriptors: (*Automata, *Decision theory), Mathematical logic, Set theory, Israel

AD-631 870 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.75
GOODYEAR AEROSPACE CORP AKRON OHIO
ADVANCED COMPUTER ORGANIZATION STUDY. VOLUME I. BASIC REPORT.
Final technical rept., Aug 64-Nov 65,
by Donald L. Rohrbacher. Apr 66, 82p. Rept. no. GER-12314-Vol-1,
Contract AF 30 (602)-3550, Proj. AF-4594, Task 459406,
RADC Tr-66-7-Vol-1
Unclassified report

See also AD-631 871.

Descriptors: (*Computers, Scientific research), Programming (Computers), Computer storage devices, Input-output devices, Dynamic programming, Algorithms, Numerical methods + procedures

Advanced general-purpose computer organizations capable of parallel data processing were studied. The study resulted in the design of two computer organizations (designated Machine I and Machine II) capable of parallel data processing and fast sorting and table searching in memory. These machine organizations were possible because of the development of a special memory that permits many processing and input-output units to access memory simultaneously without conflict. The applications effort was focused on the development of solution models which exploited the maximum amount of parallelism resident within a problem. Two major problems were investigated: a dynamic programming problem, and parallel compilation. Detailed programs were written for the dynamic programming problem on Machine I and a parallel compilation algorithm on Machine II. These same problems also were programmed on the IBM 7090 to provide a standard of comparison. In both cases, the parallel processing capability of the machines afforded significant increases in speed of program execution. (Author)

AD-631 871 Fld. 9/2
CFSTI Prices: HC $7.15 MF $2.00
GOODYEAR AEROSPACE CORP AKRON OHIO
ADVANCED COMPUTER ORGANIZATION STUDY. VOLUME II. APPENDIXES.
Final rept., Aug 64-Nov 65,
by Donald L. Rohrbacher. Apr 66, 409p. Rept. no. GER-12314-VOL-2,
Contract AF 30 (602)-3550, Proj. AF-4594, Task 459406,
RADC TR-66-7-Vol-2
Unclassified report

See also AD-631 870.

Descriptors: (*Computers, Scientific research), Programming (Computers), Dynamic programming, Computer storage devices, Input-output devices, Algorithms, Numerical methods + procedures, Flow charting

Contents: Parallel execution of the dynamic programming technique; programming of the dynamic programming technique for the IBM 7090 (sequential); programming of the dynamic programming technique for Machine I (parallel); programming manual for Machine I; bi-tonic sorting; basic organization of Machine I; parallel merging-separating networks; problem selection for a parallel processor; macro instructions for a parallel processor; parallel compilation; programming of the sequential compilation algorithm for the IBM 7090; Machine II programming; programming manual for Machine II; basic organization of Machine II; parallel nonnumeric processing.

AD-631 940 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
SIMULATION LANGUAGE REPORT GENERATORS,
by Philip J. Kiviat. Apr 66, 26p. Rept. no. P-3349,
Unclassified report

Presented at the Symposium on Simulation Techniques and Languages held at Brunel College, London, England, May 10-11, 1966.

Descriptors: (*Programming (Computers), Simulation), (*Programming languages, Simulation)

The structure of future simulation language report generators is predicted by describing the needs programmers and managers have for reports about or from simulation models and programs, by presenting a set of programming statements that satisfy these needs, and by relating these needs and statements to the simulation programming languages of today and of the future. (Author)

AD-631 941 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
FUTURE COMPUTER TECHNOLOGY AND ITS IMPACT,
by W. H. Ware. Mar 66, 30p. Rept. no. P-3279,
Unclassified report

Descriptors: (*Digital computers, Effectiveness), Air Force, Programming (Computers), History, Simulation, Computer storage devices, Magnetic core storage, Input-output devices, Teaching machines

Computer potentials are given as the ability (1) to encode information in terms of numeric symbols, (2) to parse sentences, drawing a picture of the sentence structure, or to perform algebraic manipulation, (3) to process symbolic pictorial information and reconstruct a picture, and (4) to model any system, identifying its variables and stating the relations between them, in terms of a set of mathematical relations. The attributes of the computer, or more properly the information processor, are given as follows. It is the most powerful and most flexible tool ever available to man and to society. It is not a replacement for man in any large and encompassing sense; it will displace him in many jobs, but it also will offer him many new opportunities. The computer will touch men everwhere and in every way, almost on a minute-to-minute basis. Every man will communicate through a computer whatever he does. It will change and reshape his life, modify his career, and force him to accept a life of continuous change. (Paper presented to the Board of Trustees of the RAND Corp. and the Project RAND Air Force Advisory Group in Nov 1965)

AD-631 961 Fld. 9/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
DEVELOPMENT OF NEW DIGITAL SIMULATION LANGUAGES,
by Philip J. Kiviat. Apr 66, 22p. Rept. no. P-3348,
Unclassified report

Descriptors: (*Programming languages, Simulation), (*Programming (Computers), Simulation)

Theories of simulation modelling and programming are discussed, and the design aims and a few of the language statements of SIMSCRIPT II, a second generation simulation programming language, are described. The probable future for simulation languages and simulation programming is postulated.

AD-631 991 Fld. 9/2
CFSTI Prices: HC $5.00 MF $1.00
ILLINOIS UNIV URBANA DEPT OF COMPUTER SCIENCE
QUARTERLY TECHNICAL PROGRESS REPORT (FOR) OCTOBER, NOVEMBER, DECEMBER 1965.
Dec 65, 183p. Rept. no. C00-1018-1076 ,C00-1469-0017
Unclassified report

Research supported by NSF, ONR and AEC. See also AD-627 164.

Descriptors: (*Computers, Scientific research), Circuits, Pattern recognition, Numerical methods + procedures, Programming languages, Compilers, Specifications, Programming (Computers)

Contents: Circuit research program; Hardware systems research; Time-sharing systems research; The Illinois pattern recognition computer: ILLIAC III; Numerical methods, computer arithmetic and artificial languages; ILLIAC II service, use, and program development; IBM service, use and program development; Problem specifications; and General laboratory information.

AD-632 076 Fld. 9/2, 5/5
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
EFFECT OF SIZE OF DATA PROCESSING CARDS ON MANUAL HANDLING.
Technical rept.,
by John S. Rakowski. Apr 66, 20p. Rept. no. ECOM-2686,
Task DA 1P6-20501-A448-02-35,
Unclassified report

Descriptors: (*Punched cards, Physical properties), (*Human engineering, Punched cards), Tests, Performance (Human)

Two experiments were made to determine the effect of ADP card size, thickness, ratio of height to width, and text position on handling ability. Performance times and errors for two groups of subjects were analyzed as were subjects' preferences. Results of analyses of variance showed that performance improved with small, thin cards of distinct rectangular shape. Text position had no effect on performance. Subjects generally preferred the card configurations which were most efficient. (Author)

AD-632 184 Fld. 9/2, 6/4
BELL AEROSYSTEMS CO BUFFALO N Y RESEARCH DEPT
THE APPLICATION OF ERROR CORRECTING LEARNING MACHINES TO LINEAR DYNAMIC SYSTEMS,
by J. G. Goerner, L. A. Gerhardt, and F. D. Powell. 1965, 8p. Contract AF 49 (638)-1449, Proj. AF-9769, Task 976906,
AFOSR 66-0012
Unclassified report

Availability: Published in Proceedings of the National Electronics Conference v21 p541-6 1965. Copies to DDC users only.

Descriptors: (*Learning machines, Linear systems), Least squares method, Algorithms, Control systems, Automatic

It is shown that a learning machine with orderly structure and deterministic training can model an unknown linear plant and/or find the plant's inverse to the extent physically realizable with Least Mean Squared Error Performance. Use of these properties to solve problems involving complex Least Mean Square performance indices is demonstrated and a general algorithm for deterministic search for LMSE performance is described. (Author)

AD-632 208 Fld. 9/2
CFSTI Prices: HC $2.60 MF $0.50
GENERAL ELECTRIC CO HUNTSVILLE ALA COMPUTER DEPT
GENERALIZED FORM CONTROLLED INPUT PROGRAM,

by Philip Crabb. 31 Mar 66, 30p. Contract DA-01-021-AMC-242 (Z), RSIC 541

Unclassified report

Descriptors: (*Programming (Computers), *Control sequences), Punched tape, Character recognition

This report describes a computer program for an 8K IBM 1401 Computer designed to test the hypothesis that a generalized program can be written to identify and format data elements in paper tape records generated as a by-product of filling in any standard form on a keyboard -operated paper tape device. Input to this program is provided by a utility run which converts paper tape records to magnetic tape images of those records rather than accepting input directly from paper tape. The standard form is described to the program by means of control cards which specify the data elements, their respective locations on the form, and the data element code (3-character identifier) to be assigned to each data element. A maximum of 110 data elements can be accommodated. Using the control cards as criteria, the program evaluates the paper tape data in terms of functional codes (Carriage Returns, Tabs, Backspaces, etc.) to identify data elements, justify them accordingly, perform minor edits, and assign appropriate data element codes as required. In this prototype program, line length may not exceed 99 characters and the number of lines may not exceed 99. (Author)

AD-632 244 Fld. 9/2, 12/1
CFSTI Prices: HC $5.00 MF $1.25
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
NUMERICAL ANALYSIS AND RELATED LITERATURE FOR SCIENTIFIC COMPUTER USERS.
Second ed.,
by James F. Price. Mar 66, 201p. Rept. no. D1-82-0517, Mathematical note-456

Unclassified report

Descriptors: (*Bibliographies, *Numerical analysis), (*Programming (Computers), Numerical analysis)

The Second Edition of this annotated bibliography lists the contents of over 150 books in English on numerical analysis and related literature. It is meant for the general scientific computer user and not for the research numerical analyst; the descriptions and suggestions are given with this in mind. It is expected that the most useful section will be the 27-page index which tells in which books various topics may be found. There is also a section describing how to look up further information on such topics which may be found in the literature. (Author)

AD-632 320 Fld. 9/2
MITRE CORP BEDFORD MASS
AESOP: A PROTOTYPE FOR ON-LINE USER CONTROL OF ORGANIZATIONAL DATA STORAGE, RETRIEVAL AND PROCESSING,
by Edward Bennett, Edward C. Haines, and John K.Summers. Nov 65, 24p. Rept. no. MTP-23, Contract AF 19 (628)-5165, Proj. AF-510G, ESD TR-65-145

Unclassified report

Availability: Published in Proceedings - Fall Joint Computer Conference p435-55 1965. Copies to DDC users only.

Descriptors: (*Information retrieval, Control systems), (*Data processing systems, Control systems), Cathode ray tube screens, Programming languages, Programming (Computers)

AESOP is an experimental on-line information control system serving as a prototype for a class of management or command information systems capable of giving the members of the using organization as much on-line control over system performance as possible. It is a CRT display-oriented system in that the user experiences the information system primarily through his CRT displays and exercises his control through his light pencil. The current version of the AESOP prototype operates on an IBM 7030 (Stretch) computer (65K memory with 64-bit words) with a 353 disk storage unit holding two million words. Each of the four user stations consists of an on-line Data-Display-13 display console with a photoelectric light pencil, an on-line typewriter, and a Stromberg-Carlson 3070 medium-speed printer. The AESOP system is designed to take advantage of the range of capabilities implied by this central processor and the user station equipment.

AD-632 475 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
A PROBLEM IN STATIC STORAGE ALLOCATION.
Professional paper,
by Yoichiro Fukuda. 20 Apr 66, 28p. Rept. no. SP-2435/000/00,

Unclassified report

Descriptors: (*Data storage systems, Control), Operations research, Combinatorial analysis, Scheduling, Algorithms

A primary objective of static allocation considered in this paper is to achieve efficiency in the internal operation of systems whose requirements are given and fixed, and whose function is to perform a number of different consecutive jobs. The SAGE system is a good example --the various programs and data in the system must be available in a predetermined sequence at specified times, and core storage space must be allotted to the programs and data in the most economical way. An algorithm is presented for deriving an optimal allocation scheme. This algorithm closely resembles, in spirit, a 'branch and bound' algorithm for the traveling salesman problem. (Author)

AD-632 477 Fld. 9/2, 5/8
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
TRENDS IN COMPUTER HARDWARE.
Professional paper,
by Charles Fanwick. 17 Mar 66, 35p. Rept. no. SP-2393,

Unclassified report

Descriptors: (*Computers, State-of-the-art reviews), (*Data processing systems, Computers), (*Man-machine systems, Computers), Programming (Computers), Systems engineering, Electrical engineering

The capabilities of elements of data processing systems which might be expected to be economically available about 1971 are described. This description is based on an extrapolation by the writer of the present state-of-the-art. Systems are hypothesized containing these capabilities in their parts. It is shown that these systems have capabilities inherent in the hardware which are now expected to be provided only by sophisticated software developments. It is emphasized that software system designers should anticipate hardware capabilities which will be available at the time when their software systems are expected to be available. (Author)

AD-632 558 Fld. 9/2, 5/9
CFSTI Prices: HC $5.00 MF $1.25
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
A HANDBOOK FOR PROGRAMMERS OF AUTOMATED INSTRUCTION.
Final rept.,
by William H. Melching, Robert G. Smith,Jr., Jesse C. Rupe, and John A. Cox. Sep 63, 197p.

Unclassified report

Descriptors: (*Handbooks, *Programmed instruction), Programmers

AD-632 563 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.75
STANFORD RESEARCH INST MENLO PARK CALIF
GRAPHICAL-DATA-PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Rept. no. 22, 1 Jun 63-31 Jan 66 (Final),
by A. E. Brain, and J. H. Munson. Apr 66, 91p. Contract DA-36-039-AMC-03247 (E), Proj. DA-1P0-20401-A-327-02-1,SR1-4565 ECOM 03247-F

Unclassified report

Continuation of Contract DA-36-039-SC-78343. See also AD-627 335.

Descriptors: (*Graphics, Data processing systems), (*Information retrieval, Graphics), (*Pattern recognition, Graphics), (*Data processing systems, Military requirements), Analog-digital computers, Learning machines, Adaptive systems, Data storage systems, Maps, Computer logic, Coding Pictures, Optical equipment

The design and operation of MINOS II are briefly summarized, including the built-in algorithms, the method of weight-changing, and the use of snake-in-the-box codes for treating analog parameters. The design of a 1024image optical preprocessor is discussed in the light of its development from the 100-image preprocessor. An SDS-910 computer was installed to supervise MINOS II; when the ultimate objective of this project is reached, the pattern-recognition equipment will be fully integrated into a data-storage and retrieval complex, and this was the first step toward that goal. A discussion is given of the experimental results starting from the early hand-drawn map symbol experiments with the 100-image preprocessor. Corresponding experiments were carried out with the 1024-image preprocessor using edge-detector masks occupying 8 percent of the retinal field, as compared with 50 percent masks in the earlier equipment. A selective-attention experiment is described in detail. This isolated approximately ten map symbols appearing in the field simultaneously, in a manner which would permit them to be correctly categorized if the appropriate pattern-recognition function were provided. (Author)

AD-632 576 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.75
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING
MACHINE LEARNING FOR GENERAL PROBLEM SOLVING.
Rept. for 1964-65,
by David L. Johnson. 1965, 95p. Contract AF-AFOSR-939-65, AFOSR 66-0835

Unclassified report

Descriptors: (*Learning machines, *Problem solving), (*Artificial intelligence, *Digital computers), Trigonometry, Equations, Game theory, Learning, Adaptive systems, Algebras, Computer logic

Part I describes progress in research relevant to problem solving and learning using trigonometric identities and logical equations. The work previously described (AD-608 544) dealing with trigonometric proof learning has been analyzed and extended with the general solution and learning approach applied to proofs of logical equations. Also included is a brief description of work which investigates concept formation modeled in one sense after the work of Piaget. Part II relates the research in tree pruning as related to computers and game playing. Recent work has emphasized learning processes independent of scoring functions. Comparison is made between human play and ma-

chine play in specific game environments. Part II of the report describes evaluation of the research goal of extending the problem solving and learning processes into the field of integral calculus. It was determined, after considerable experimentation and research, that more useful research expenditure could be made in investigations of other learning areas. (Author)

AD-632 581 Fld. 9/2, 6/8
CFSTI Prices: HC $4.00 MF $1.00
ADAMS (CHARLES W) ASSOCIATES INC BEDFORD MASS
DEVELOPMENT OF A MACHINE RETRIEVAL SYSTEM FOR STORAGE DATA ON RATION ITEMS.
Final rept. 28 Jun 63-2 Apr 64,
by Murray E. Sherry. Apr 66, 129p. Contract DA-19-129-AMC-187 (N), Proj. DA-1K643303D548,
USA-NLABS TR-66-22-FD ,FD 42
Unclassified report

Descriptors: (*Information retrieval, *Military rations), Data storage systems, Programming (Computers), Food

A coding scheme for machine storage and retrieval of storage study data on ration items has been evaluated and a revised version recommended. An experimental program for a magnetic tape GE-225 computer system has been designed and written. This program can retrieve storage study data from a data corpus previously stored on magnetic tape. It can, furthermore, perform simple correlations on pairs of details, such as storage time versus experimental data, stored in the data corpus. A second experimental program that acquires the storage study data directly from typed input onto magnetic tape has been written. The output of this program, which was developed for the Keydata Corporation PDP-4 on-line data processing system, has been made compatible with the GE-225. The programs were tested by operating them with a small data corpus of experimental information. (Author)

AD-632 602 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.75
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
QUASI-LINEAR SEQUENTIAL MACHINES.
Research rept.,
by Pierre Lavallee. Feb 66, 99p. Rept. no. PIB-MRI-1315-66,
Contract AF 49 (638)-1402,
Unclassified report

Descriptors: (*Switching circuits, Mathematical analysis), Sequences

A class of sequential circuits, in which the next state and output functions are linear functions of the present state and non-linear functions of the inputs, is analyzed. The problem of deciding if an arbitrary sequential machine belongs to this class, is solved using cyclic and transient binary partitions generated by the output variables. Special cases of this class, such as the linear machines, and machines which perform multiplication and division in finite fields are considered as quasi-linear machines with a special coding of the input combinations. This class of machines is shown to possess very short diagnosing sequences of length at most n, for a q state machine. A procedure is presented whereby any sequential machine is simulated by a quasi-linear machine using a minimum number of extra delay elements over and above that needed for non quasi-linear realization. Finally a computational algorithm is developed for the detection of a quasi-linear next-state assignment for a machine with a non-quasi-linear output function. (Author)

AD-631 858 See Fld. 7/4

AD-631 863 See Fld. 12/1

AD-631 974 See Fld. 5/1

AD-632 067 See Fld. 9/3

AD-632 146 See Fld. 8/11

AD-632 147 See Fld. 8/11

AD-632 150 See Fld. 8/11

AD-632 181 See Fld. 5/2

AD-632 339 See Fld. 17/9

AD-632 365 See Fld. 12/2

AD-632 390 See Fld. 9/1

AD-632 402 See Fld. 12/2

AD-632 425 See Fld. 9/3

AD-632 468 See Fld. 9/1

AD-632 473 See Fld. 5/2

AD-632 479 See Fld. 12/1

AD-632 480 See Fld. 5/2

AD-632 489 See Fld. 17/9

AD-632 523 See Fld. 7/4

AD-632 551 See Fld. 5/2

AD-632 569 See Fld. 5/7

AD-632 587 See Fld. 5/2

AD-632 599 See Fld. 6/4

9/3. ELECTRONIC AND ELECTRICAL ENGINEERNG

AD-631 836 Fld. 9/3, 12/2
CFSTI Prices: HC $2.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
RECORDS OF AUTOMATION AND TELEMECHANICS (SELECTED ARTICLES).
15 Mar 66, 41p. Rept. no. FTD-TT-65-902, TT 66-61129
Unclassified report

Edited trans. of Archiwum Automatyki i Telemechaniki (Poland) v9 n12 p133-48, 167-77 1964.

Descriptors: (*Optimization, *Control systems), Functions, Mathematical programming, Automation, Poland

Contents: Dependendence of Optimum Control on the Parameters of the Controlled Object, by Roman Kulikowski; and On a Certain Problem of Higher-Level Control by Andrzej Straszak.

AD-632 067 Fld. 9/3, 9/2
CFSTI Prices: HC $4.00 MF $0.75
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
NOTES ON SYSTEM THEORY. VOLUME VIII,
by R. A. Baker, E. R. Berlekamp, R. N. Biswas, T. Fine, and Lionel Lecoq. 1 Nov 65, 103p.
Rept. no. ERL-65-30,
Contract AF-AFOSR-639-65 ,AF-AFOSR-139-65
Unclassified report

See also AD-611 083.

Descriptors: (*Electronics, Scientific research), Stability, Coding, Flow charting, Search theory, Automata, Signals, Pattern recognition, Game theory, Combinatorial analysis, Circuits, Theory, Electrical networks

Contents: Comments on the Stability of Linear Time Invariant Systems With Infinite Dimensional State Spaces, by R. A. Baker; Encoding a Geometric Source, by E. R. Berlekamp; Some Comments on B1 Codes, by E. R. Berlekamp; A 'Gain' Formula for Linear Vector Flow Graphs, by R. N. Biswas; An Optimum Search Strategy for Locating the Maximum of a Unimodal Function, by T. Fine; Construction of Regular Expressions for Binary Machines, by Lionel Lecoq; La Grange Multipliers and Signal Design, by L. P. Seidman; Pattern Classification in 'Qubic', by I. L. Traiger; and On the Passivity of Nonlinear RLC N-ports, by K. K. Wong.

AD-632 425 Fld. 9/3, 9/2, 10/2, 20/5, +
CFSTI Prices: MF $3.00
SOUTHWESTERN IEEE CONFERENCE
ANNUAL SOUTHWESTERN IEEE CONFERENCE (18TH) AND SHOW, APRIL 20, 21, 22, 1966, DALLAS, TEXAS.
Conference record.
1966, 723p.
Unclassified report

A Region Five Meeting of the Institute of Electrical and Electronics Engineers.

Availability: Available from Southwestern IEEE Conference, Dallas, Texas, $3.00 IEEE Members; $4.50 Nonmembers.

Descriptors: (*Electrical engineering, Symposia), (*Electronics, Symposia), Microminiaturization (Electronics), Transmission lines, Distribution, Systems analysis, Design, Computers, Analog computers, Lasers, Plasma physics, Networks, Generators, Communication systems, Antennas, Solid state physics, Engineering, Education

The sessions of the conference were devoted to microelectronic technology and applications, geoscience and biomedical electronics, power transmission and distribution, systems design, computer design, laser and plasma electronics, networks, power generation, communications, antennas and propagation, microwave and solid state devices, power systems engineering, and engineering education seminar.

AD-632 498 Fld. 9/3, 13/11, 13/10
CFSTI Prices: HC $3.00 MF $0.75
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
HYDRAULIC ANALYSIS OF A 15-HORSEPOWER, FREE FLOODING, SUBMERGED ELECTRIC MOTOR.
Research and development rept.,
by A. B. Harbage. Apr 66, 67p. Rept. no. MEL-109/66,
Proj. S-F013-12-15, Task 4829,
Unclassified report

Descriptors: (*Electric motors, *Underwater equipment), Liquid cooled, Fluid mechanics, Fluid flow, Pumps

This is a report of the estimations made for hydraulic losses in a submersible electric motor. Wherever possible application of established equations relating loss to a specific geometry were used. For geometric areas not covered, a variety of extensions to these equations were employed. Validity of the analysis is shown by close agreement with experimental data. (Author)

AD-632 083 See Fld. 9/5

AD-632 243 See Fld. 17/2

AD-632 260 See Fld. 12/2

9/4. INFORMATION THEORY

AD-631 864 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING

SOME RESULTS ON THE BINARY CONVOLUTIONAL TREE CODE GENERATORS.
Scientific rept.,
by Shu Lin. 15 Dec 65, 46p. Rept. no. Scientific-5,
Contract AF 19 (628)-4379, Proj. AF-5628,
Task 562801,
AFCRL 66-73

Unclassified report

See also AD-626 733.

Descriptors: (*Search theory, Coding), Topology

A simple and practical search procedure for obtaining the binary convolutional tree code generators is presented. A tabulation of the good generators of rate 2/3, and 1/12 is given. The codes of rate 1/2 and 1/3 found by this procedure are comparable with Bussgang's results by exhaustive searching. (Author)

AD-631 865 Fld. 9/4
CFSTI Prices: HC $1.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING
SOME CODES WHICH ARE INVARIENT UNDER A DOUBLY-TRANSITIVE PERMUTATION GROUP AND THEIR CONNECTION WITH BALANCED INCOMPLETE BLOCK DESIGNS.
Scientific rept.,
by Tadao Kasami, and Shu Lin. 28 Jan 66, 16p.
Rept. no. scientific-6,
Contract AF 19 (628)-4379, Proj. AF-5628,
Task 562801,
AFCRL 66-142

Unclassified report

Descriptors: (*Coding, Invariance), (*Combinatorial analysis, Coding), Permutations, Groups (Mathematics)

If a binary code is invariant under a doubly-transitive permutation group, then the set of all code words of weight j forms a balanced incomplete block design. Besides the extended normal BCH codes and the extended quadratic residue codes, the Reed-Muller codes are proven to be invariant under a doubly-transitive permutation group. Thus, BIB designs can be derived from these classes of codes. It is shown that if the symbols of the Reed-Muller codes are properly arranged, and if the first digit is omitted, then all Reed-Muller codes are cyclic (Author)

AD-631 866 Fld. 9/4
CFSTI Prices: HC $1.00 MF $0.50
HAWAII UNIV HONOLULU DEPT OF ELECTRICAL ENGINEERING
ERROR ANALYSIS PARSING FOR CONTEXT-FREE LANGUAGES.
Scientific rept.,
by Tadao Kasami. 25 Jan 66, 19p. Rept. no. Scientific-7,
Contract AF 19 (628)-4379, Proj. AF-5628,
Task 562801,
AFCRL 66-143

Unclassified report

Descriptors: (*Context free grammars, Errors), Algorithms, Sequences, Coding

An aspect of the problem of error analysis parsing for context-free languages is discussed. An error analysis parsing can be considered a parsing problem concerning a grammar whose rules have 'weight'. Some theoretical framework is presented. (Author)

AD-632 423 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
APPLICATION OF CODING THEORY.
Semi-annual rept.,
by Arthur E. Laemmel. 31 May 64, 45p. Rept. no. PIBMRI-1284.1-65,
Contract DA-36-039-sc-89219,

Unclassified report

Descriptors: (*Coding, Theory), (*Optimization, Coding), Information theory, Signals, Data transmission systems

A class of signal compressing codes which has received little attention in the literature is studied. These codes can be described by a finite state diagram, but not by a single finite code table. Some optimization methods are discussed, although the optimum code is known only for very special cases, and bounds are obtained on the performance of such codes.

AD-632 574 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
WEIGHT DISTRIBUTION FORMULA FOR SOME CLASS OF CYCLIC CODES,
by Tadao Kasami. Apr 66, 28p. Rept. no. R-285,
Contract DA-28-043-AMC-00073 (E),NSF-GK-690 Proj. DA-20014501B31F,

Unclassified report

Research supported in part by AFCRL, Contract AF 19 (628)-4379.

Descriptors: (*Coding, *Statistical analysis)

AD-632 082 See Fld. 17/10

AD-632 102 See Fld. 17/2

AD-632 569 See Fld. 5/7

9/5. SUBSYSTEMS

AD-631 842 Fld. 9/5
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
TUNABLE, HIGH-POWER FERRITE FREQUENCY DOUBLER.
Technical rept.,
by Maurice Weiner. Apr 66, 43p. Rept. no. ECOM-2692,
Proj. DA-1L0-13001-A-91A, Task 1L0-13001-A-91A-26-00,

Unclassified report

Descriptors: (*Frequency multipliers, Ferromagnetic materials), Tuning devices, Radiofrequency power, Yttrium compounds, Iron compounds, Garnet, Disks, Microwave equipment, Superhigh frequency

The report describes the development of a high-efficiency, tunable ferrite frequency doubler operating at 17.0 GHz. The optimum efficiencies are 30% to 40% with incident power levels up to 10 kw peak, 3.0 watts average. The doubler consists of a yttrium-iron-garnet (YIG) disc located at the junction of X- and K sub u-band rectangular waveguides. Attempts to scale the doubler into the millimeter range are in progress. (Author)

AD-631 976 Fld. 9/5, 14/2
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO)
A SELF-BALANCING DIRECT CURRENT COMPARATOR FOR 20,000 AMPERES,
by M. P. MacMartin, and N. L. Kusters. 8 Jan 65, 7p. Rept. no. NRC-8832,

Unclassified report

Availability: Published in IEEE Transactions on Magnetics vMag-1 n4 p396-402 Dec 1965. Copies to DDC users only.

Descriptors: (*Comparators, Direct current), Transformers, Electric currents, Measuring devices (Electrical + electronic), Canada

The direct current comparator is a current ratio device which uses a two-core magnetic modulator as an ampere-turn balance detector. The applications of this comparator to precision measurements are very limited, unless it is made self-balancing by feedback. A transistorized self-balancing direct current comparator for 20,000 amperes which employs two stages to obtain a maximum ratio of 20 000/1 is described. The self-balancing circuit has a range of plus or minus 10 percent and an open loop gain of over 10 000. An analysis is made of the errors of the comparator including the effects of large external magnetic fields, magnetic memory, and alternating currents in the ratio windings. The total error increases with the amount of self-balancing required, but does not exceed 10 parts per million, provided the comparator is operated near its rated ampere-turn level. Applications of the comparator to the calibration of transductors (dc current transformers) and dc shunts at full rated current are discussed. (Author)

AD-632 012 Fld. 9/5, 17/2.1
CFSTI Prices: HC $1.00 MF $0.50
MICHIGAN UNIV ANN ARBOR RADAR AND OPTICS LAB
LIMITATIONS OF SERIES-FED ARRAYS IN BROADBAND COMMUNICATIONS,
by Robert B. Crane, and C. Bruce Sharpe. Apr 66, 25p. Rept. no. 6400-51-T,
Contract DA-28-043-AMC-00013 (E),

Unclassified report

Rept. on Proj. Michigan.

Descriptors: (*Antenna arrays, *Communication systems), Antenna feeds, Broadband, Signals, Distortion, Linear systems, Electric filters

The report covers an investigation of the signal distortion which results when long, series-fed arrays are used for communication. It is shown that under certain conditions the antenna array can be considered as a linear filter, the response of which is a function of frequency as well as of spatial coordinates. The distortion accompanying the transmission as measured by the least mean square difference between the transmitter and the received signal is derived. This expression /s evaluated for the case of a uniformly excited array and a rectangular bandpass signal spectrum. In the absence of noise, the transmitted signal can be completely recovered in the receiver by employment of the proper linear filter. In the presence of noise, the signal cannot, of course, be completely recovered. However, a technique is investigated for minimizing the distortion in this case by use of a prefilter and a postfilter. (Author)

AD-632 069 Fld. 9/5, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MEASURING CONVERTERS OF ELECTRIC MAGNITUDES TO PULSE FREQUENCY,
by Yu. N. Evlanov, and R. R. Kharchenko. 30 Mar 66, 22p. Rept. no. FTD-TT-65-908, TT 66-61188

Unclassified report

Unedited rough draft trans. of Elektrichestvo (USSR) n1 p48-53 1965.

Descriptors: (*Frequency converters, Electromagnetic pulses), USSR, Frequency meters, Linear systems, Measurement, Direct current, Frequency, Circuits

A survey was made of the principles of constructing linear measuring converters of electric magnitudes to pulse frequency.

AD-632 083 Fld. 9/5, 20/12, 9/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

RECENT DEVELOPMENTS IN SOLID-STATE MICROWAVE DEVICES.
Technical rept.,
by Wesley G. Matthei. Mar 66, 42p. Rept. no. ECOM-2676,
Proj. DA-1P6-22001A056, Task 04,
Unclassified report

Descriptors: (*Microwave equipment, *Solid state physics), (*Semiconductor devices, Microwave equipment), Parametric amplifiers, Transistors, Oscillators, Frequency multipliers, Avalanche diodes, Radio receivers, Integrated circuits, Modules (Electronic), State-of-the-art reviews

The purpose of this report is to review some of the outstanding accomplishments in the field of solid-state microwave devices which have occurred during the past 18 months. The latest improvements in parametric amplifiers and transistor amplifiers are noted. The area of microwave solid-state oscillators is discussed in detail by dividing it into three parts; transistor oscillators and multipliers, avalanche transit time (Read) diodes, and Gunn oscillators. Curves are presented which indicate the current state of the art of transistor sources. The mechanisms of the avalanche transit time diode and the Gunn oscillator are described in a qualitative manner. A brief discussion is given about the new circuit and device packaging techniques and Schottky-barrier mixer diodes which are being developed to improve microwave receivers. A few examples of microwave modules, using hybrid techniques are given, and some examples of microwave integrated circuits are noted. It is concluded that the solid-state microwave field is in a stage of rapid growth and changing technology, and that this expansion will continue in its rapid pace, due to the development of improved transistors, bulk-effect devices, hybrid and integrated circuit modules. (Author)

AD-632 140 Fld. 9/5, 20/9, 20/14
CFSTI Prices: HC $2.60 MF $0.50
ARIZONA UNIV TUCSON ENGINEERING EXPERIMENT STATION
FIELD OF AN AXIALLY SLOTTED CIRCULAR CYLINDER CLAD WITH AN INHOMOGENEOUS DIELECTRIC.
Rept. for Aug 65-Jan 66,
by George Tyras. Feb 66, 24p. Rept. no. Scientific-3,
Contract AF 19 (628)-3834, Proj. 4642, Task 464202,
AFCRL 66-203
Unclassified report

See also AD-621 751.

Descriptors: (*Slot antennas, *Antenna radiation patterns), (*Plasma sheath, Slot antennas), Dielectrics, Field theory, Antenna configurations, Numerical analysis

The problem of an axial slot on a circular cylinder clad with a radially inhomogeneous plasma (dielectric) was considered recently by Rusch. Although his formulation is quite general inasmuch as it admits a realistic approximation to the plasma sheath inhomogeneities, the resulting solution is not well suited for computations of field patterns of large cylinders. In the present formulation the author considers the dielectric permittivity profile of the form E (P)= (P/b)2p, a < P < b, where 'a' is the radius of the conducting cylinder, 'b' is the outer radius of the dielectric coating and 'p' is an arbitrary parameter. It follows that the assumed profile is capable of representing an inhomogeneous cold plasma when p > 0 and a real dielectric when p < 0. The apparent advantage of the present formulating is the fact that the wave equation can be solved in terms of known functions and the solution can be extended to large cylinders. Field expressions appropriate to small and large cylinders are found using standard methods of harmonic series representation, Watson Transformation and saddle point integration. In the case of large cylinders coated with cold plasma, the radiation patterns are plotted for various combinations of the cylinder radius, thickness of the coating, and the inhomogeneity gradient. (Author)

AD-632 186 Fld. 9/5, 20/3
CFSTI Prices: HC $6.60 MF $0.75
UTAH UNIV SALT LAKE CITY MICROWAVE DEVICE AND PHYSICAL ELECTRONICS LAB
CYCLOTRON WAVE DEVICES STUDY.
Final rept. 1 Jul 63-30 Jun 65,
by T. Kao, D. C. Watson, K. I. Talbot, M. T. Ahlquist, and C. H. Durney. Apr 66, 66p. Contract DA-36-039-AMC-02372 (E), Proj. DA-1P6-22001-A-055-4,
ECOM 02372-F
Unclassified report

See also AD-618 735.

Descriptors: (*Cyclotron waves, *Microwave amplifiers), Radiofrequency power, Direct current, Pumping (Electronics), Space charges, S band, Power transformers, Electron beams, Effectiveness

A small-signal coupled-mode analysis of the cyclotron -synchronous wave amplifier has been carried out including the transverse modes and force-free modes. The small-signal gain and spent-beam characteristics have been investigated, as well as the coupling of the beam modes in a Cuccia coupler. A computer program has been carried out to investigate the d-c beam effects in a cyclotron-synchronous wave pump circuit. Experiments on the cyclotron-synchronous wave amplifier have consistently shown low gain with appreciable pump interception. These results are understood in terms of d-c beam behavior in the pump structure. An extensive computer analysis of a cyclotron-wave power converter has been carried out including the effects of d-c space-charge forces. These results consistently predict high conversion frequencies, of the order of 80 n performed on an S-band 3-watt cyclotron-wave power converter and efficiencies of the order of 25 per cent have been obtained. The low efficiencies obtained experimentally as contrasted with the high theoretical efficiencies are due to a loss of beam current. (Author)

AD-632 230 Fld. 9/5, 12/2
CFSTI Prices: HC $4.00 MF $1.00
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
NONLINEAR PROGRAMMING APPLICATION FOR INTEGRATED CIRCUIT DESIGN.
by Teruyoshi Asai. Mar 66, 145p. Rept. no. 66-20,
Contract Nonr-233 (52),AT (11-1)-GEN-10 Proj. 14,
Unclassified report

Descriptors: (*Integrated circuits, Design), (*Nonlinear programming, Engineering), Optimization, Propagation

The non-linear programming technique which was designed by the author, is based on the Created Response Surface Technique (CRST) although the response surfaces are created outside of the solution'region. The problem is treated in two different ways, utilizing linear and non-linear constraints but with the same non-linear criterion function which represents propagation delay. The constraint equations and the criterion function are derived from the characteristics of monolithic components applied to the basic design considerations of a two-stage DTL NAND-logic circuit fabricated from a single silicon ship. Programs have been prepared which apply the modified CRST method to the problem. Exploitation of these programs demonstrate the feasibility of the optimization scheme in circuit design. The non-linear constraint program yielded a 4% improvement in propagation delay over the linear case. Considering the difficulties inherent in conventional trial-and-error circuit design methods, the relative ease of applying the optimization scheme advocated here, and the results obtained by this method, it is concluded that the technique has definite value in integrated circuit design problems. (Author)

AD-632 290 Fld. 9/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
DEVICE FOR AUTOMATIC CONTROL OF THE MAGNITUDE OF THE THRESHOLD CONTRAST,
by K. K. Polevitskii. 29 Apr 66, 5p. Rept. no. FTD-HT-66-80,
TT 66-61201
Unclassified report

Unedited rough draft trans. of Patent (USSR) 160 735, appl. 804912/26-24, 26 Feb 64.

Descriptors: (*Automatic gain control, *Tracking), Photoelectric cells (Electron tubes), Patents, USSR

The object of the invention is a device of automatic control of the magnitude of the threshold contrast for photoelectric tracking systems with an amplifier which is distinguished by the fact, that with the purpose of detecting single objects on nonuniform background under conditions of highly variable illumination and insuring automatic control of amplification through partial modulation of the input signal from the background, to the input of the amplifier are connected two photoelement load resistors, the smaller of which is shunted by the contacts of a vibrator. (Author)

AD-632 295 Fld. 9/5
CFSTI Prices: HC $2.00 MF $0.75
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y
INVESTIGATION OF SCATTERING PROPERTIES OF A LARGE ARRAY OF INDEPENDENT, ACTIVE X-BAND ELEMENTS.
Final rept.,
by Dean L. Baerwald, and Anthony F. Snyder. Apr 66, 52p. Rept. no. RADC-TR-65-540,
Proj. AF-4519, Task 451901,
Unclassified report

Descriptors: (*Antenna arrays, Scattering), (*Spiral antennas, X-band), Tunnel diodes, Phase arrays, Amplifiers, Bandwidth, Antenna radiation patterns, Gain

This report describes the predicted and measured characteristics of an 81-element X-band array of integrated spiral antenna-tunnel diode amplifier units. Monostatic scattering patterns are given for in-phase elements and for progressively shifted rows of elements. Theoretical scattering pattern functions are derived for arrays of independent scattering elements. Array radar cross section is compared to a flat conducting plate of similar dimensions. Element and array bandwidth are determined and compared. (Author)

AD-632 537 Fld. 9/5, 9/1
CFSTI Prices: HC $3.00 MF $0.75
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
FREQUENCY MULTIPLICATION IN CIRCUITS WITH ABRUPT-JUNCTION VARACTOR DIODES.
Technical rept.,
by Werner M. Rupp. Feb 66, 77p. Rept. no. ECOM-2666,
Proj. DA-1P6-22001-A-056, Task 1P6-22001-A-056-01-13,
TT 66-61237
Unclassified report

Trans. of Technische Hochschule, Munich. Thesis.

Descriptors: (*Frequency multipliers, *Circuits), (*Varactor diodes, Circuits), Harmonic generators, Analysis, West Germany

Circuits are analyzed, which utilize abrupt-junction varactor diodes, to generate harmonics of the frequency of the applied pump voltage. As original ideas, the varactor diode is represented by an equivalent circuit, in which the generation of the harmonics is ascribed to a nonlinear voltage source; and the Fourier coefficients of the solutions are represented as power series of the pump amplitude. For any order of harmonic generation, the nonlinear dependence of the Fourier coefficients on the pump amplitude is expressed by auxiliary functions. These functions form an infinite system of equations which has as parameters only the normalized pump voltage and the network functions of the linear circuit, which originates if the varactor diode is replaced by the series connection of a linear condenser and a resistance. Due to the pumping process, the d. c. charge of the varactor diode is reduced and the average capacitance of the diode increases. It is assumed that the associated detuning of the circuit is corrected by suitably increasing the bias voltage of the diode. All interesting quantities, such as input impedance, output power and efficiency can be expressed as a function of the pump amplitude with only one auxiliary function, which is characteristic for the given circuit. Frequency doubling and frequency tripling with idler are analyzed in detail. For frequency doubling, xthe results of maximum drive-level operation are presented and optimum design rules are established for four different requirements. (Author)

AD-631 936 **See Fld. 20/3**

AD-631 951 **See Fld. 10/3**

AD-632 005 **See Fld. 9/1**

AD-632 160 **See Fld. 4/2**

AD-632 232 **See Fld. 9/1**

AD-632 275 **See Fld. 20/14**

AD-632 309 **See Fld. 17/8**

AD-632 420 **See Fld. 9/1**

AD-632 547 **See Fld. 4/1**

9/6. TELEMETRY

AD-631 837 Fld. 9/6, 8/5, 8/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE QUESTION OF THE APPLICATION OF RADIOTELEMETERING DEVICES FOR THE DETERMINATION OF THE GEODETIC FIXED POINT,
by B. Delong. 23 Mar 66, 18p. Rept. no. FTD-TT-65-1434, TT 66-61130
Unclassified report

Unedited rough draft trans. of Studia Geophysica et Geodaetica (Czechoslovakia) v8 n3 p239-46 1964.

Descriptors: (*Telemeter systems, *Geodesics), (*Surveying, Telemeter systems), Radio equipment, Distance - measuring equipment, Czechoslovakia

The evaluation of tests of the MRA -1/CW telemetering device by observation of the details of geodetic points which occur as a result of the compacting of trigonometric networks, is presented in this article. The application of the test in which the position and altitude of 132 points of the investigated field (i.e., detailed network of points, the precise location of which are known) are determined with the aid of the tellurometer. These tests show that radiotelemetering devices can be used with success for the observation of detailed points and that the polar method is the best and most expedient both from the standpoint of technical observation and from the standpoint of economy. The observation of detailed points by the polar method from one point were implemented with precision by characterizing the average quadratic error of position with relation to precise details of the network plus or minus 6 cm. Such precision is satisfactory for determining detailed points by means of intersections or with the assistance of markings or of auxiliary polygonometric operations. If the polar method with two points is used, the precision in position is increased by plus or minus 5 cm which corresponds to the detailed point with high precision. (Author)

AD-631 857 Fld. 9/6
CFSTI Prices: HC $16.90 MF $1.00
TRW SPACE TECHNOLOGY LABS LOS ANGELES CALIF
THE ANALYSIS OF ADVANCED SYNCHRONOUS TELEMETRY TECHNIQUES.
Final rept.,
by Stan Fralick, John Mumma, and J. A. Develet Jr.. 15 Oct 61, 173p. Contract N123 (62738)27472A
Unclassified report

Descriptors: (*Telemeter systems, Analysis), (*Pulse code modulation, Telemeter systems), Synchronization (Electronics), Performance (Engineering), Phase-locked systems, Ballistics

This report presents the results of a theoretical analysis of an advanced synchronous PCM telemetry system. The system, called 'carrier-lock,' utilizes a bit-rate that is synchronous with the carrier to retain bit, word, and frame synchronization alone when the signal strength drops to a level too low to permit such synchronization to maintained by conventional means. The absolute performance of this system is determined and compared with the performance or a standard PCM telemetry system. The results of a study of typical signal strength records from various Ballistic Missile flights are also presented. The results of the comparison of the two methods of obtaining bit-sync when viewed in the light of the signal strength records, indicate that the synchronous telemetry system has major advantages for those systems in which a digit error rate of 10 to the -1 or higher can be tolerated. Thus with the advant of more complex PCM encoding such as orthogonal, simplex, or redundant error correction codes, the carrier lock system looks most promising. (Author)

AD-631 979 Fld. 9/6
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO)
NOMOGRAPH SIMPLIFIES DESIGN OF F-M/F-M TELEMETRY SYSTEMS,
by J. K. Pulfer, and A. C. Hudson. 1957, 3p. Rept. no. NRC-8891,
Unclassified report

Availability: Published in Electronics Mar 21 1966. Copies to DDC users only.

Descriptors: (*Telemeter systems, Frequency modulation), (*Nomographs, Telemeter systems), Canada

The chart eliminates the need for separate calculations for nonstandard data channels and indicates the tradeoffs that result in the best system design.

Field 10-ENERGY CONVERSION (NON-PROPULSIVE)

10/1. CONVERSION TECHNIQUES

AD-632 050 **See Fld. 13/2**

AD-632 312 **See Fld. 20/3**

10/2. POWER SOURCES

AD-632 103 Fld. 10/2, 7/4, 9/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH NJ
DIRECT PRODUCTION OF ELECTRICAL PULSES FROM GALVANIC CELLS-II.
Technical rept.,
by Herbert F. Hunger, James E. Wynn, and Nunzio J. Sanfilippo. Mar 66, 27p. Rept. no. ECOM-2670,
Proj. DA-1L0-13001-A-91A
Unclassified report

Descriptors: (*Electrolytic cells, *Energy conversion), (*Electric power production, Electrolytic cells), (*Electrochemistry, Electrolytic cells), Formaldehyde, Anodes (Electrolytic cell), Cathodes (Electrolytic cell), Lead compounds, Dioxides, Sulfuric acid, Electrolytes, Oscillation, Pulse generators, Electric currents, Voltage, Transients

Based on half cell studies on anodic half elements showing simultaneous current and voltage oscillations, further work was done in order to transfer this oscillatory behavior into complete galvanic cells. Complete cell studies with simulated electromotively active counter electrodes permitted one to define the electrochemical requirements for a self-self oscillating galvanic cell. Based on these guidelines an experimental cell was designed and constructed. The cell was capable of delivering pulsating current, voltage, and power instead of regular DC. The electrical and thermodynamic characteristics of the cell were analyzed. (Author)

AD-632 271 Fld. 10/2
CFSTI Prices: HC $1.00 MF $0.50
MARINE CORPS LANDING FORCE DEVELOPMENT CENTER QUANTICO VA
EVALUATION OF GENERATOR SET PU-613.
Final rept.
6 May 66, 18p. Proj. CMC-43-65-06,
Unclassified report

Descriptors: (*Generators, Tests), Teletype systems, Radar beacons, Radio equipment, Radar equipment, Power supplies

The generator set PU-613 is a portable air cooled gasoline engine generator that produces 500 watts of 400 cycle, 115 volts, alternating current and up to 80 watts of 28 volt direct current. The engine generator assembly is enclosed in an acoustical housing that diminishes the sound level. Modifications are required on the PU-613 in order to make it suitable as a substitute for the PU-181, PU-278, PU-279, and PU-422. The PU-613 does possess the required electrical characteristics to provide 400 cycle AC and 28 volt DC power for the Teletypewriter Set AN/TGC-14, Radio Set AN/TRC-27, Radar Beacon TPN-7, and Radar Set AN/TPS-21. The power cable and fittings with the Radio Set AN/TRC-27 and Radar Set AN/TPS-21 are compatible with the PU-613. The power cable and fittings with the Teletypewriter AN/TGC-14 and the Radar Beacon AN/TPN-7 are not compatible with the PU-613. The PU-613 is 24 pounds heavier than the PU-279; however, the total weight of 63 pounds for the PU-613 allows it to be carried on a pack board as a one-man carry for use with the TPN-7. The reduced sound level of the PU-613 as compared to the PU-279 is highly desirable for the applications in which the TPN-7 is used. (Author)

AD-632 319 Fld. 10/2, 7/4
CFSTI Prices: HC $2.00 MF $0.50
PENNSYLVANIA UNIV PHILADELPHIA ELECTRO-CHEMISTRY LAB
ELECTRO-OXIDATION OF SATURATED HYDROCARBONS ON PLATINIZED PLATINUM IN PHOSPHORIC ACID.
Interim technical progress rept., 7 Sep 65-6 Apr 66,

by E. Gileadi, and G. Stoner. 22 Apr 66, 32p. Contract DA-44-009-AMC-469 (T),
Unclassified report

Descriptors: (*Fuel cells, Electrochemistry), (*Hydrocarbons, Oxidation), (*Propanes, Oxidation), Phosphoric acids, Electrolytes, Catalysts, Platinum, Reaction kinetics, Thermochemistry, Transients

The anodic oxidation of propane in phosphoric acid has been studied on a platinum black electrocatalyst in the temperature range 100-150C. A rotating cylinder electrode was used for obtaining reaction orders with respect to propane and will be used in studies of other saturated hydrocarbons, now in progress. The purpose is to extend the present mechanistic study of hydrocarbon oxidation to various isomers of saturated hydrocarbon containing six carbon atoms. This will yield important parameters pertinent to 'fuel cell performance' in terms of structural and molecular weight effects.

AD-632 531 Fld. 10/2
CFSTI Prices: HC $3.00 MF $0.50
AMERICAN CYANAMID CO STAMFORD CONN CENTRAL RESEARCH DIV
HYDROCARBON FUEL CELL ELECTRODES.
Interim progress rept. no. 2, 16 Jul 65-15 Jan 66, by V. Corso,Jr.. 22 Apr 66, 52p. Contract DA-44-009-AMC-897 (T),
Unclassified report

See also AD-623 549.

Descriptors: (*Fuel cells, *Electrodes), Performance (Engineering), Hydrocarbons, Alkanes, Halocarbon plastics, Platinum, Graphite, Corrosion-resistant alloys, Sintering, Catalysis, Air, Propanes, Surface area, Crystals, Phosphoric acid

Progress is reported on a program aimed at the development of an electrode system which will produce 20 w/sq ft at a minimum of 0.4 volt in a phosphoric acid matrix type cell utilizing a liquid hydrocarbon fuel (n-octane) and air, with a total platinum loading of not more than 20 g/sq ft. Emphasis was placed on evaluating the performance of standard and experimental electrodes on normal octane and air at temperatures in the range 150 to 200C.

AD-632 425 See Fld. 9/3

10/3. ENERGY STORAGE

AD-631 951 Fld. 10/3, 22/2, 9/5
CFSTI Prices: HC $2.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS M D
SHUNT VOLTAGE REGULATOR CIRCUIT FOR NICKEL-CADMIUM CELLS WITH AUXILIARY ELECTRODES,
by Floyd E. Ford, and Piotr P. M. Liwski. Apr 66, 33p. Rept. no. MEL-93/66,
Proj. NASA-S-12730-G
Unclassified report

Descriptors: (*Alkaline cells, *Circuits), (*Voltage regulators, Circuits), (*Electric shunts, Voltage regulators), Electrodes, ontrol, Satellite networks, Weight, Temperature, Optimization, Nickel, Cadmium

A circuit to control charge current entering nickel-cadmium cells with auxiliary electrodes ('three-terminal' cells) using a shunt method of control was developed for use in satellite power systems requiring minimum weight and space with optimum control and temperature compensation. Reduction in charge current is caused when the set limits of either the total battery terminal voltage, or the potential of any individual cell at this auxiliary electrode, is exceeded. (Author)

Field 11-MATERIALS

11/1. ADHESIVES AND SEALS

AD-632 362 Fld. 11/1
CFSTI Prices: HC $6.00 MF $1.25
SPERRY ELECTRONIC TUBE DIV SPERRY RAND CORP GAINESVILLE FLA
LOW-TEMPERATURE REFRACTORY METAL-TO-CERAMIC SEALS.
Final rept. 1 Jan 64-15 Jan 66, by L. A. Tentarelli, J. M. White, and R. W. Buck. Apr 66, 258p. Rept. no. NJ-2769-0167-8, Contract DA-36-039-AMC-03734 (E), Proj. DA-1P6-22001-A-055-01-10, ECOM 03734-F
Unclassified report

Descriptors: (*Seals (Stoppers), Ceramic materials), (*Refractory metals, Sealing compounds), Hermetic seals, Tapes, Bonding, Solutions, Tungsten, Manganese, Iron, Reliability, Electron tubes, Tensite properties, Surface properties

The report covers a two-year study on low-temperature refractory metal-to-ceramic seals. The development phase was concerned with: the effect of process variables; effects of ball milling on particle size and seal strength; effects of changes in Mn concentration and the effects of compositional changes in the W, Mn, Fe metalizing system. Low-temperature mixes were adapted to silk screen and transfer tape metalizing techniques. Seal reliability was studied through heat cycling experiments. Numerous suspension mixes as well as metalizing solutions were investigated. The low-temperature process was found satisfactory on various alumina and beryllia bodies. Solution metalizing investigations were concerned with: concentration of salts: thickening agents and solution stability. Feasibility of the low-temperature process was demonstrated by the fabrication of a number of hermetic seals used in production tubes. A comparison of low-temperature metalizing with conventional Mo/Mn metalizing process is presented. A theoretical phase involved: electron probe analysis of low-temperature metal-ceramic interface; X-ray diffraction techniques to detect compounds formed at the interface; various experiments designed to synthesize compounds formed at the interface, and micrographic and electron microscope techniques to detect internal microstructural changes that occur in a ceramic during heat cycling. (Author)

11/2. CERAMICS, REFRACTORIES, AND GLASSES

AD-632 239 Fld. 11/2
CFSTI Prices: HC $1.10 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB
PERFORMANCE OF IN-FLIGHT-APPLIED RAIN REPELLENTS ON CHEMICALLY HARDENED GLASS SURFACES.
2 Mar 66, 1p. Rept. no. NAEC-AML-2404,
Unclassified report

Descriptors: (*Glass, Weatherproofing), Raindrops, Chemicals, Hardening, Moisture-proofing

Two types of glass were used: (1) 'Chemcor' produced by Corning Glass Works; and (2) 'Herculite II' produced by the Pittsburgh Plate Glass Company. There was no difference between the effectiveness of the rain repellent applied to chemically hardened glass and to the conventionally treated safety glass. The initial and subsequent adhesion of the repellent film was essentially the same. It is not anticipated that the chemically hardened surfaces will interfere with inflight-applied rain repellents conforming to the requirements of MIL-R-81261 (WEP). (Author)

AD-631 987 See Fld. 7/2

AD-632 381 See Fld. 20/11

AD-632 403 See Fld. 20/12

AD-632 409 See Fld. 20/12

AD-632 545 See Fld. 20/5

11/3. COATINGS, COLORANTS, AND FINISHES

AD-631 852 Fld. 11/3, 11/7
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ORGANIC CHROMES AS CORROSION INHIBITORS IN BASIC PAINTS,
by D. Cermakova, J. Nemcova, and J. Dohnalova. 30 Mar 66, 11p. Rept. no. FTD-TT-65-1425, TT 66-61133
Unclassified report

Unedited rough draft trans. of Korose a Ochrana Materialu (Czechoslovakia) n1 3p 1963.

Descriptors: (*Corrosion inhibition, Coatings), (*Paints, Additives), (*Chromium compounds, *Metalorganic compounds), Cyclohexanols, Stability, Chromic acids, Esters, Salts, Oxidation, Plastic coatings, Czechoslovakia

When studying organic chromes as anticorrosive admixtures to basic paints and lacquers, best results were obtained with paint with 1.8% CrO4 (2) in the form chromium of 1-methylcyclohexanol-1, with which the protective effectiveness was increased by perhaps 10 times against paint with 13.8% - in the form of zinc chromium. Organic chromium reduces the tendency of paint toward blistering. (Author)

AD-632 238 Fld. 11/3
CFSTI Prices: HC $1.10 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB
SPECIFICATION FOR AML 95K ALL-ACRYLIC LACQUER.
21 Mar 66, 4p. Rept. no. NAEC-AML-2360,
Unclassified report

Descriptors: (*Varnishes, *Acrylic resins), Specifications, Nitrocellulose, Epoxy plastics, Polyamide plastics

Test results are given that were obtained when AML 95K all-acrylic lacquer was tested against the requirements of Specification MIL-L-81352. Results are also for tests with the acrylic-nitrocellulose lacquer Specification MIL-L-19537 and epoxy polyamide coating Specification MIL-C-22750. The AML 95K is at least equivalent in all properties and in many respects to Specifications MIL-C-22750 coating and MIL-L-19537 lacquer.

AD-632 248 Fld. 11/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB
AN EVALUATION OF THE EFFECT OF THE THICKNESS OF WASH PRIMER,
by R. S. Adler. 21 Jan 66, 15p. Rept. no. NAEC-AML-2343,PAN-12-12
Task RRMA-03-013/200-1/F020-03-01,
Unclassified report

Descriptors: (*Paint primers, Thickness), Effectiveness, Adhesion, Corrosion resistance, Aluminum alloys, Metal plates, Epoxy plastics, Polyamide plastics, Acrylic resins, Nitrocellulose

Adhesion characteristics of the specifications MIL-C-22750A (WEP) epoxy-polyamide and the

MIL-C-19537 (Aer) acrylic-nitrocellulose systems using thick and thin coatings of MIL-C-8514 (Aer) wash primer are compared over various metal surfaces. The adhesion of both finish systems utilizing the heavier .6 plus or minus .1 mils wash primer is significantly better in dry adhesion tests and as good, or better, in wet adhesion tests than the .2 - .3 mils wash primed systems. Corrosion resistance of 2024 bare aluminum alloy panels with no chemical treatment, and coated with the aforementioned systems is better when thick .6 plus or minus .1 mil MIL-C-8514 (Aer) wash primer is applied as compared to the thin .2 - .3 mil wash primer. Recommendation is made to use the thicker coat of wash primer and to incorporate the necessary changes in the applicalbe process specifications. (Author)

AD-632 177 See Fld. 13/8

11/4. COMPOSITE MATERIALS

AD-632 492 Fld. 11/4, 1/3
CFSTI Prices: HC $3.00 MF $0.50
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
STRUCTURAL EFFICIENCY OF COMPOSITE MATERIALS FOR AIRCRAFT APPLICATIONS.
Technical information series,
by Norris F. Dow, and B. Walter Rosen. Apr 66, 52p. Rept. no. R66SD22,
Contract AF 33 (615)-2447,
Unclassified report

Presented at the AIAA/ASME Structures and Materials Conference (7th), Cocoa Beach, Fla., Apr 18-20 1966.

Descriptors: (*Wings, Composite materials), (*Composite materials, *Aircraft), Filaments, Reinforcing materials, Sandwich construction, Loading (Mechanics), Airplane panels, Effectiveness, Beams (Structural), Magnesium, Epoxy plastics

Evaluations are made of the potential of advanced filamentary composites for aircraft wing beams, including stiffened, multi-web, and sandwich construction. Throughout, the approach used employs the 'structural index' concept, in which the structural efficiency is related directly to the design loading conditions. The results define areas in which advanced composites have the greatest potential for improvements in aircraft structural efficiency. (Author)

11/6. METALLURGY AND METALLOGRAPHY

AD-631 850 Fld. 11/6, 12/1, 20/11
CFSTI Prices: HC $1.00 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
APPLICATION OF THE METHOD OF COMPOSITION TO STRESS-RUPTURE DATA ON STEEL,
Memorandum rept.,
by James G. Faller. Nov 65, 14p. Rept. no. BRL-MR-1712,
Proj. RDT/E-1P014501A31C
Unclassified report

Descriptors: (*Steel, *Rupture), (*Stresses, *Statistical analysis), Rupture, Temperature, Time

Data on the time taken for a metallic specimen to fail under a given stress and constant temperature has been fitted by a power law relation and the assumed correlation tested by linear regression analysis. Results show that the stress at which rupture occurs for a given temperature and time can be predicted with a high degree of confidence in this particular case. (Author)

AD-631 851 Fld. 11/6, 11/9, 20/6, 7/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
REPORTS OF THE ACADEMY OF SCIENCES OF THE UKRAINIAN SSR. (SELECTED ARTICLES).
15 Mar 66, 23p. Rept. no. FTD-TT-65-1038, TT 66-61132
Unclassified report

Edited trans. of Akademiya Nauk URSR, Kiev. Dopovidi, n8 p1035-7, 1038-42, 1043-6 1964.

Descriptors: (*Steel, Stresses), (*Plastics, Reinforcing materials), (*Luminescence, Anthracenes), USSR, Reports, Fatigue (Mechanics), Fibers, Tensile properties, Polarization, Crystals

Contents: Influence of residual stresses on the fatigue strength of steel with an acute stress concentration; evaluation of the strength of fiber-reinforced plastics on oriented, crossed and disoriented bases; polarization of luminescence of pure and impure anthracene crystals.x

AD-631 856 Fld. 11/6, 20/12
CFSTI Prices: HC $1.00 MF $0.50
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
ON THE THEORY OF INTERSTITIAL SOLUTIONS OF THE NOBLE METALS IN LEAD, TIN, THALLIUM, INDIUM, AND CADMIUM.
Technical rept.,
by Thomas R. Anthony, and David Turnbull. 14 Jan 66, 10p. Contract SD-88,
ARPA 23
Unclassified report

Descriptors: (*Diffusion, Metals), (*Copper, Diffusion), (*Silver, Diffusion), (*Gold, Diffusion), Absorption (Physical), Lead, Tin, Thallium, Indium, Cadmium, Copper alloys, Gold alloys, Silver alloys, Lead alloys, Tin alloys, Thallium alloys, Indium alloys, Cadmium alloys, Solid solutions

The interstitial dissolution of the noble metals (Cu, Ag, and Au) in lead, tin, thallium, indium, and cadmium is explained by d-d correlations binding between the isoelectronic cores of the solute and solvent atoms. (Author)

AD-631 928 Fld. 11/6, 20/12, 20/2
CFSTI Prices: HC $3.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METALLURGY
EFFECT OF FLUID FLOW ON SOLIDIFICATION STRUCTURE.
Technical rept.,
by M. C. Flemings, H. P. Utech, and E. S. Miksch. Mar 66, 73p. Rept. no. TR-1,
Contract Nonr-3963 (09),
Unclassified report

Descriptors: (*Crystal growth, *Fluid flow), Freezing, Grain structures (Metallurgy), Indium alloys, Antimony alloys, Tin, Aluminum alloys, Copper alloys, Ice, Magnetic fields, Supercooling, Heat transfer

Samples of tellurium-doped indium antimonide that exhibited solute banding when solidified in a horizontal boat under ordinary conditions showed no bands when solidified in the presence of a vertical DC magnetic field. In crystal growth of tin, as of indium antimonide, marked thermal fluctuations occur in the liquid during growth as a result of thermal convection. Effects are examined here of growth parameters on these fluctuations. A dilute aluminum-copper alloy that exhibited solute banding when solidified in a horizontal crystal growing boat showed no bands when solidified in the presence of the magnetic field. The morphology and kinetics of ice grown in supercooled water are markedly affected by convection of the water. Brief consideration is given the problem of analysis of effect of fluid flow on dendritic growth in undercooled melts, employing the idealized 'Fisher dendrite'. The analysis is then extended to growth of dendrites in non-undercooled alloy melts and it is shown that similar effects are to be expected.

AD-631 962 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIV
GALVANIC SERIES OF METALS AS RELATED TO CORROSION.
Technical rept.,
by Ervin C. Tinsley. Feb 66, 22p. Proj. DA-1L013001A91A,
RIA 66-469
Unclassified report

Descriptors: (*Corrosion, Electrolysis), (*Corrosion inhibition, Electrodes), Tables, Metals, Voltage, Compatibility, Alloys

A revised electromotive series has been prepared for use by design engineers. Tables were prepared from experimental data and from available literature references. The experimental work indicated many variables were present in the half-cell potential measurement procedure. Many factors that could have caused deviations in results are discussed. This work provides information as to the location of various alloys previously not included in the electromotive series. The use of the improved table will be of value to the designer for his selection of compatible materials, and enable him to hold the possibilities of galvanic corrosion to a minimum. (Author)

AD-632 040 Fld. 11/6, 20/12, 20/2
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y
THE MECHANICAL PROPERTIES OF IRON SINGLE CRYSTALS CONTAINING LESS THAN 5 X .003 PPM CARBON,
by D. F. Stein, J. R. Low, Jr., and A. U. Seybolt. 8 Mar 63, 10p. Contract DA-31-124-ARO (D)-95,
AROD 4074:6
Unclassified report

Availability: Published in Acta Metallurgica v11 p1253-62 Nov 1963. Copies to DDC users only.

Descriptors: (*Iron, *Single crystals), Mechanical properties, Carbon, Impurities, Purification, Stresses, Temperature

A method was developed to reduce carbon, nitrogen, and oxygen to low levels in iron. Using a radioactive tracer technique to analyze for carbon in iron, it is shown that carbon can be reduced to less than 0.005 p.p.m. with this purification method. It was found that the temperature dependence of the yield stress of iron containing less than 0.005 p.p.m. carbon was much less than for iron of usual purity. This result provides evidence that it is the carbon in solution and not the Peierls-Nabarro stress that is responsible for the temperature dependence of the yield stress in iron. Earlier work on 3% silicon-iron has shown that impurity locking is not important in determining the dependence of the yield stress on temperature; therefore, it is concluded that the temperature dependence of the yield strength in alpha-iron of usual purity is due primarily to the interaction of mobile dislocations with interstitial impurities in solid solutions. (Author)

AD-632 042 Fld. 11/6
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF ENGINEERING RESEARCH
DAS DREISTOFFSYSTEM EISEN-ALUMINIUM-BOR (TERTIARY METALLIC SYSTEM: IRON-ALUMINUM-BORON),

by H. H. Stadelmaier, R. E. Burgess, and H. H. Davis. 1965, 2p. Contract DA-31-124-ARO (D)-277,
AROD 5010:8

Unclassified report

Availability: Published in Metall, v3 n20 p225-6 Jan 1966. Copies to DDC users only.

Descriptors: (*Iron alloys, Phase studies), (*Aluminum alloys, Phase studies), (*Boron alloys, Phase studies), Metallurgy

AD-632 071 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
STRUCTURAL DIAGRAM OF NIOBIUM-NICKEL SYSTEM,
by V. N. Svechnikov, V. M. Pan, and V. G. Korobeinikova. 30 Mar 66, 18p. Rept. no. FTD-TT-65-1489,
TT 66-61189

Unclassified report

Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Instytut Metallofizyky. Sbornik Nauchnykh Rabot, n19 p196-205 1964.

Descriptors: (*Niobium alloys, *Nickel alloys), USSR, Hardness, Microstructure, Eutectics, Solid solutions, Phase studies

A complete diagram of phase equilibriums of a niobium-nickel system was formulated. It was found that from the side of nickel rich alloys, the variant of the diagram, introduced by S. A. Pogodin and A. N. Zelikman, is confirmed. It was shown that in alloys of Nb-Ni system, four phases exist in solid phase: the alpha-solid solution of nickel and niobium (maximum solubility of about 4.5%, solubility at 1100C - 1.2% and at 800C - 0.6% Ni), alphasolid solution of niobium in nickel (maximum solubility about 13.5%, solubility of 1100C - about 12% Nb (delta-phase intermetallide Ni3Nb with a melting point of 1430C and a very narrow (less than 1%) area of homogeneity and eta phase - intermetallide NiNb with a wide area of homogeneity (6.4% at 800; 8.4% at 1000 and 12.8% Xat 1170C). It was established that phases existing in the alloys of the system form with liquid three triphase nonvariant equilibriums. Nickel additions, raising the hardness of niobium, do not improve the preservation of hardness at high temperature (800 - 1000C). Small (up to 4 weight %) additions of nickel considerably increase the hardness resistance of niobium (bi - 5-fold) when testing in air for a period of 5 hours at 1000C. (Author)

AD-632 072 Fld. 11/6, 13/8, 13/10
CFSTI Prices: HC $1.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
PROPERTIES OF THE WELD HEAT-AFFECTED ZONE IN HY-130/150 STEEL.
Research and development phase rept.,
by P. W. Holsberg, and W. G. Schreitz. Apr 66, 15p. Rept. no. MEL-87/66,
Proj. S-F020-01-05, Task 0728,

Unclassified report

Descriptors: (*Steel, *Weldability), (*Metallography, Steel), (*Embrittlement, Steel), Iron alloys, Nickel alloys, Chromium alloys, Molybdenum alloys, Vanadium alloys, Ship plates, High-temperature research, Welding, Thermal stresses, Stress relieving, Impact tests, Marine engineering, Simulation, Welds

Properties of the weld heat-affected zone, including hot-cracking tendencies and effects of thermal cycling on strength and toughness, were determined for a 5Ni-Cr-Mo-V steel developed as an HY-130/150 hull plate alloy. The hot-cracking tendency of the alloy was low. The yield strength of the heat-affected zone was equivalent to that of the base metal. The Charpy V-notch impact strength of samples which had received double thermal cycles, simulating multipass weldments, was equivalent to that of the baseplate in both the as-welded and the stress-relieved conditions. These results, obtained by weld-simulation methods, were confirmed by impact tests of samples from the heat-affected zone of actual weldments. The impact strength of the as-deposited weld metal was low compared to the baseplate and was greatly reduced by stress-relief treatment. (Author)

AD-632 081 Fld. 11/6, 13/8
CFSTI Prices: HC $1.00 MF $0.50
LEHIGH UNIV BETHLEHEM PA INST OF RESEARCH
STUDY OF THE EFFECT OF SOLIDIFICATION STRUCTURES ON THE STRENGTH OF METALS.
Quarterly Progress rept. no. 3,
by R. W. Kraft, and R. W. Hertzberg. 28 Apr 66, 11p. Contract DA-36-038-AMC-2723 (A),

Unclassified report

See also AD-624 772.

Descriptors: (*Eutectics, Microstructure), (*Mechanical working, Eutectics), (*Alloys, Eutectics), Aluminum alloys, Nickel alloys, Extrusion, Tensile properties, Magnesium, Copper, Metals, Magnesium alloys, Copper alloys, Freezing, Castings

Progress on work associated with the mechanical working of Al-Al3Ni eutectic alloy specimens consisted of: improvements made to the unidirectional solidification apparatus to produce more perfectly aligned specimens; the hydrostatic extrusion of specimens with a colony microstructure by various amounts up to 65% reduction in area in one operation; and a preliminary evaluation of the effect of strain hardening on the yield strength of as-cast material. In addition, it has been found that specimens with the colony microstructure could not be drawn at a reduction of 9%, although they could be extruded by reduction up to at least 65%. Work on the other phase of the research concerned with the mechanical properties of as-controlled magnesium base eutectics included: the construction of a new melting chamber to facilitate the production of master heats; experimentation with several heats of four different alloys; the unidirectional solidification of Mg-Cu and Mg-Ni specimens; and preliminary evaluation of the mechanical properties of one of the 'controlled' eutectics (viz., Mg-Mg2Cu). (Author)

AD-632 291 Fld. 11/6, 20/13
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATION OF THE THERMODYNAMIC PROPERTIES OF THE TERNARY METALLIC SYSTEM BI-CU-SB AT THE SECTION NBI:NSB = 1 : 1 BY THE METHOD OF EMF,
by A. L. Lomov, and A. N. Krestovnikov. 29 Apr 66, 11p. Rept. no. FTD-TT-65-1849,
TT 66-61202

Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Khimii (USSR) v38 n1 p188-92 1965.

Descriptors: (*Bismuth alloys, Phase studies), (*Antimony alloys, Phase studies), (*Copper alloys, Phase studies), (*Thermodynamics, Alloys), USSR, Liquid metals, High-temperature research, Entropy

The study of the thermodynamic characteristics of the ternary liquid metallic fusions Bi-Cu-Sb with which there is preserved as unchangeable the ration N sub Bi : N sub Sb = 1 : 1 at 1215 K by the method of emf established that for the system there are characteristic negative deviations from Raoult's law, positive-negative heats, and positive excess entropies of mixing. The positive excess entropies of the mixing in the fusions studied are established in connection with the great difference in the atomic volumes of the components of the metallic pair Bi-Cu and Cu-Sb. (Author)

AD-632 314 Fld. 11/6, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MEASURING STRESSES IN METALS BY THE EDDY -CURRENT METHOD,
by M. M. Shel. 29 Apr 66, 12p. Rept. no. FTD-TT-65-1892,
TT 66-61207

Unclassified report

Unedited rough draft trans. of Khimicheskoe i Neftyanoe Mashinostroenie (USSR) n4 p35-7 1964.

Descriptors: (*Metals, Stresses), (*Stresses, Measurement), Electric currents, Transducers, Magnetic properties, Steel, Test methods, USSR

The design and operation of a transducer for measuring stresses by the Eddy-Current method is described; as is its application to measurements on a series of steel specimens.

AD-632 355 Fld. 11/6, 13/8
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
THE EFFECT OF THERMAL HISTORY ON THE YIELD BEHAVIOR OF IRON,
by Attwell M. Adair, Rollin E. Hook, and R. L. McGaughey. 9 Aug 65, 9p. Rept. no. ARL-66-0053,
Proj. AF-7021, Task 702100,

Unclassified report

Prepared in cooperation with General Time Corp., Rolling Meadows, Ill.

Availability: Published in Transactions of the Metallurgical Society of AIME v236 p174-8 Feb 1966. Copies to DDC users only.

Descriptors: (*Heat treatment, Iron), (*Iron, Deformation), Grain boundaries, Microstructure, Stresses, Impurities, Crystal lattice defects, Strain (Mechanics), Quenching (Cooling), Temperature

The initial yielding characteristics of a vacuum-melted iron have been measured as a function of thermal history after slow cooling or quenching from a 700C recrystallization anneal. A thermal history favoring the segregation of interstitials to grain boundaries results in a material having high values of upper and lower yield stress and long, irregular Luders' plateaus, whereas specimens treated to minimize grain boundary segregation have significantly lower values of these yielding characteristics. The structure of typical grain boundary areas as revealed by electron transmission microscopy is consistent with these findings. The grain boundaries in iron are considered to be principally responsible for the release of dislocations during macroscopic yielding and it is suggested that strong locking results when a substantial amount of grain boundary segregation is present; it follows that weak locking results from a more random distribution of interstitials to grown in dislocations. (Author)

AD-632 405 Fld. 11/6, 20/12, 20/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
PRODUCTION OF MOLYBDENUM SINGLE CRYSTALS WITH ELECTRON-BEAM FLOATING ZONE MELT.
Research translation,
by Ming Nay-ben. Feb 66, 14p. Rept. no. Emm-65-3,
Contract AF 19 (628)-5073,
TT 66-61212

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v19 n3 p160-4 1963. See also AD-602 629.

Descriptors: (*Molybdenum, Single crystals), (*Single crystals, Zone melting), (*Zone melting, Electron beams), Crystal growth, Purification, Melting, Vacuum systems, Circuits, Crystal structure, Evaporation, Refining (Metallurgy), Electron bombardment, China

This paper describes an electron bombardment furnace made in China used to produce refractory metal single crystals. Molybdenum single crystals are prepared and examined, and techniques for the production are described. Miscroscopic examinations reveal numerous terraces on the surfaces of the molybdenum crystals. These terraces are tentatively identified as evaporation terraces. (Author)

AD-632 434 Fld. 11/6, 20/2, 20/12
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
ELASTIC BEHAVIOR OF POLYCRYSTALLINE CHROMIUM NEAR THE NEEL TEMPERATURE,
by J. A. Roberson, and H. A. Lipsitt. 19 Apr 65, 8p. Rept. no. ARL-66-0046,
Unclassified report

Availability: Published in Journal of Applied Physics v36 n9 p2843-8 Sep 1965. Copies to DDC users only.

Descriptors: (*Chromium, Elasticity), Shear stresses, Crystal lattices, Temperature, Antiferromagnetism, Paramagnetic materials, Atomic orbitals, Electron spin resonance

Young's modulus, the shear modulus, and Poisson's ratio have been determined for pure polycrystalline chromium as a function of temperature and thermal history. Both sonic and mechanical measurements were made, and it was found that all of the above properties show anomalous behavior near 37C. The nature of the anomalies is such that Young's modulus and Poisson's ratio drop rather sharply over a narrow temperature range while the shear modulus increases slightly. The temperature at which this occurs seems to be fixed for a fixed composition and stress condition, although the extent of the anomalies is strongly influenced by thermal history. It is believed that this behavior is a result of an antiferromagnetic to paramagnetic transition, and that it is influenced by both internal and applied stresses. A model is developed to explain the observed behavior. Since Poisson's ratio is very nearly zero in the temperature range of the magnetic transition, it becomes necessary to consider the volume changes occurring under stress. When this is done, the anomalous behavior in Young's modulus is shown to be a necessary consequence of the anomaly in Poisson's ratio, which is described in terms of magnetostrictive versus elastic strain energy. (Author)

AD-632 456 Fld. 11/6, 20/2
CFSTI Prices: HC $2.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS SCIENCE
THE SUBSTRUCTURE, STORED ENERGY, AND PROPERTIES OF SHOCK-LOADED COPPER.
Technical rept.,
by D. C. Brillhart, R. J. De Angelis, A. G. Preban, J. B. Cohen, and P. Gordon. 11 Apr 66, 35p.
Rept. no. TR-10,
Contract Nonr-1228 (20), Proj. NR-031-680,
Unclassified report

Prepared in cooperation with Illinois Inst. of Tech., Chicago. Dept. of Metallurgical Engineering, Contract Nonr-1406 (03), Proj. NR-552-02 and Technical rept. no. TR-14.

Descriptors: (*Copper, *Shock (Mechanics)), Crystal substructure, Crystal lattice defects, Electron microscopy, Twinning (Crystallography), Deformation, Density, Resistance (Electrical), X-ray diffraction analysis, Energy

Changes in stored energy, resistivity, density, x-ray line broadening and dislocation arrangements (from transmission electron microscopy) have been measured on Cu specimens shock-loaded at 75-435 kb. The stored energy in shock-loaded copper, and changes in density and resistivity are larger than those after conventional deformation. A high density of twins makes an appreciable contribution to all the measured quantities. Dislocation densities rise to values of 10 to the 11th power lines per sq cm at the highest pressure. The resistivity, density and x-ray measurements yield dislocation densities in substantial agreement at all pressures, after correcting for the effects due to the twins. At the higher pressures electron microscopy yields results that are lower by a factor of about 5-10. Dislocation densities from stored energy measurements are high; this finding can be rationalized by the consideration that the deformation twin boundaries present are largely incoherent. There is no evidence for homogeneous dislocation nucleation during shock-loading. (Author)

AD-632 608 Fld. 11/6, 20/6, 20/12
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO
OPTICAL AND MAGNETO-OPTICAL MEASUREMENTS ON MAGNETIC RARE EARTH-COBALT ALLOY FILMS.
Technical rept.,
by Axel M. Stoffel, and Karl J. Strnat. Mar 66, 41p. Rept. no. AFML-TR-65-445,
Proj. AF-7371, Task 737103,
Unclassified report

Descriptors: (*Cobalt alloys, Magneto-optic effect), (*Rare earth elements, Cobalt alloys), (*Magneto-optic effect, Ferromagnetic materials), Metal films, Intermetallic compounds, Cobalt, Yttrium compounds, Neodymium alloys, Gadolinium alloys, Samarium compounds, Hysteresis, Optical properties, Refractive index, Annealing, Oxidation, Magnetic properties

The results of an investigation of the Kerr magneto-optic effect and the complex refractive index for pure cobalt and for four ferromagnetic rare earth-cobalt alloys of the composition RCo5 are reported. Magnetic data of all films are also given. The thin film samples were prepared by vapor deposition in ultrahigh vacuum and measured in situ. The effect of annealing and atmospheric corrosion on the optical and magneto-optical properties was investigated. The index of refraction, n, was found to decrease considerably after short exposure to air, while the Kerr effect increased. The rare earth alloys show an optical and magneto-optical behavior similar to that of cobalt. Dispersion curves of n, k, theta sub M, epsilon sub M, Q sub o, and q for wave-lengths of 400 to 616 millimicron are presented. (Author)

AD-631 854 **See Fld. 14/2**

AD-631 924 **See Fld. 7/4**

AD-632 004 **See Fld. 13/8**

AD-632 039 **See Fld. 20/2**

AD-632 123 **See Fld. 1/3**

AD-632 210 **See Fld. 20/11**

AD-632 240 **See Fld. 20/6**

AD-632 316 **See Fld. 20/12**

AD-632 554 **See Fld. 20/2**

11/7. MISCELLANEOUS MATERIALS

AD-631 852 **See Fld. 11/3**

AD-632 220 **See Fld. 7/5**

AD-632 316 **See Fld. 20/12**

11/8. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-631 838 Fld. 11/8, 21/4, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
NEW METHOD OF EVALUATING THE EFFECTIVENESS OF ACTION OF ANTI-SCORING ADMIXTURES TO OILS AND FUELS,
by K. I. Klimov, A. V. Vilenkin, and G. I. Kichkin. 23 Mar 66, 15p. Rept. no. FTD-TT-65-1491,
TT 66-61131
Unclassified report

Unedited rough draft trans. of Vsesoiuznoe NauchnoTekhnicheskoe Soveshchanie po Prisadkam k Maslam i Toplivam. Trudy (USSR) p273-8 1960-61.

Descriptors: (*Lubricant additives, Test methods), (*Fuel additives, Test methods), Wear resistance, Test equipment, Friction, Effectiveness, Oils, Fuels, USSR

To evaluate anti-scoring properties of lubricating materials an essentially new type of friction machine, having a pair of intersecting cylinders and a periodic surface contact, was developed and proposed. The necessity of relative evaluation of anti scoring-properties of oils containing admixtures on friction machines in order to model the testing conditions by the sliding rate, contact periodicity and temperature in a wide range of their changes is shown. A method was developed for the relative evaluation of anti-scoring properties of lubrication materials in conditions that model real conditions of oil operation. Anti-scoring properties of certain petroleum products in pure form and with admixtures were investigated. It was shown that the proposed instrument and evaluation method have a high sensitivity in comparison with other methods and instruments. (Author)

AD-632 041 Fld. 11/8
MASSACHUSETTS INST OF TECH CAMBRIDGE
EFFECT OF SURFACE ENERGY ON LUBRICATION,
by Ernest Rabinowicz. 1964, 6p. Contract DA-31-124-ARO (D)-143,
AROD 4266:3
Unclassified report

Availability: Published in Fundamental Phenomena in the Material Sciences p78-83 1966. Copies to DDC users only.

Descriptors: (*Lubrication, Performance (Engineering)), (*Surface properties, Energy), Lubricants, Boundary layer, Films, Two-phase flow, Friction, Wear resistance, Contamination, Metals

The paper contains a discussion of the way in which boundary lubricants function. A perfectly lubricated junction is one in which a continuous film of lubricant separates the materials, so that they do not contact directly. This very effective type of lubrication can be achieved quite readily with a solid-film lubricant, such as a graphite-resin combination; but when a liquid lubricant is used, there is always some metal -metal contact. A hypothesis is made concerning two different ways in which this metal-metal contact occurs. Either the lubricant film is continuous except over one region (or a few regions) where the film is broken and contact is made, or else the film is partial over the whole junction. These may be referred to as the two -phase and uniform contamination models, respectively.

11/9. PLASTICS

AD-632 287 Fld. 11/9, 21/9.1, 11/10
CFSTI Prices: HC $4.00 MF $0.75
PLASTICS TECHNICAL EVALUATION CENTER PICATINNY ARSENAL DOVER NJ
COMPATIBILITY OF PLASTICS WITH LIQUID PROPELLANTS, FUELS AND OXIDIZERS,
by Norman E. Beach. Jan 66, 126p. Rept. no. Plastec-25,
Unclassified report

Descriptors: (*Liquid rocket propellants, Compatibility), (*Plastics, Compatibility), (*Elastomers, Compatibility), Oxidizers, Fuels, Data, Liquid rocket oxidizers

Much has been published on the subject of the compatibility of plastics with liquid propellants, fuels and oxidizers, but invariable from the standpoint of the propellant or fuel. This report is a rearrangement of the published compatibility data from the standpoint of the plastic material. It is in the form of a tabulation, with primary arrangement by plastic (or elastomeric) material; and thereunder, by fuel. All arrangements are alphabetical, in the form given in the original reference; that is, either by generic or trade designation. The compatibility evaluation is in terms of the original document, briefly culled to show behavior of the material at a given temperature and for a given time. Elastomers are included; but oils, lubricants and greases are omitted, even though based on polymers. The information has been drawn from 43 references, which are annotated so that the information extracted from them shall have additional significance. (Author)

AD-632 538 Fld. 11/9, 13/8, 1/3
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS LG HANSCOM FIELD MASS
THE AFCRL FLYING THREAD LOOM PROCESS FOR IMPROVED SCRIM REINFORCED BALLOON MATERIALS.
Instrumentation papers,
by Arthur O. Korn Jr.. Feb 66, 25p. Rept. no. AFCRL-IP-92, AFCRL-66-99
Proj. AF-6665, Task 666501,
Unclassified report

Descriptors: (*Balloons, Laminated plastics), (*Laminated plastics, Balloons), Films, Reinforcing materials, Polyester plastics, Dacron, Films, Weaving, Machine tools

The cost of reliable, scrim-reinforced balloon materials has been substantially reduced through use of the AFCRL Flying Thread Loom (FTL). This versatile machine promises to extend the present capabilities of scientific ballooning by providing improved lightweight materials for extreme altitudes and thin films of unusual strengths for extra-heavy payloads. The principle of operation is described and results of flight tests using two new FTL materials are reported. Savings in cost and in balloon -volume requirements are demonstrated by charts. Future plans include addition of a gore-cutting and tailoring device and a card-input control mechanism. (Author)

AD-631 851 **See Fld. 11/6**

AD-632 262 **See Fld. 7/3**

AD-632 504 **See Fld. 13/4**

AD-632 604 **See Fld. 13/10**

AD-632 626 **See Fld. 6/5**

11/10. RUBBERS

AD-632 035 Fld. 11/10, 7/3
CFSTI Prices: HC $3.00 MF $0.75
OLIN MATHIESON CHEMICAL CORP NEW HAVEN CONN CHEMICALS DIV
SIB POLYMER DEVELOPMENT.
Final rept. 1 Feb 65-31 Jan 66,
by H. A. Schroeder. 28 Feb 66, 61p. Contract NObs-92143,
Unclassified report

See also AD-624 544.

Descriptors: (*Boron compounds, *Siloxanes), (*Polymers, Siloxanes), (*Elastomers, Heat-resistant materials), Antioxidants, Peroxides, Vulcanizates, Aging (Materials), Additives, Dielectric properties, Low-temperature research, Elongation, Tensile properties, Iron compounds, Tungsten compounds, Oxides

Selected members of the SiB polymer family were developed for high temperature applicable elastomers. Three measurements, namely tensile strength, elongation, and hardness, were performed from -80F to 800F other characteristics were obtained on specific specimens. With the proper selection and concentration of reinforcing fillers and antioxidants (ferric or tungsten oxide are indispensable), vulcanizates of SiB-2 and SiB-4 rubber exhibit outstanding heat-aging resistance. They show a tensile strength of 400-450 psi. and an elongation of 100-150% at ambient temperature, and withstand temperatures of 800I to 900IF in air, demonstrating a useful life of 24 hours and 2 hours, respectively. They were still flexible at -40 to -80F, indicating a wide range of elasticity. Limited experimentation indicated their immunity to humidity and water immersion. The solvent resistance was improved by introduction of a minute number of chloromethyl groups. Dielectric constants approached those of the silicones. Since the uncured SiB elastomers can be molded or extruded, special applications such as wire coating, gasket and O-ring fabrication can be envisioned.

AD-632 196 Fld. 11/10
CFSTI Prices: HC $3.00 MF $0.75
CLOTHING AND ORGANIC MATERIALS DIV ARMY NATICK LABS MASS
NITROSO RUBBER HANDBOOK.
Technical rept., Jan 57-Dec 65,
by Malcolm C. Henry, and Charles B. Griffis.
Jan 66, 68p. Rept. no. C/OM-15,
Proj. DA-1C024401A329,
USA-NLABS TR-66-2-CM
Unclassified report

Descriptors: (*Synthetic rubber, Handbooks), Polymers, Elastomers, Organic nitrogen compounds, Fluorine compounds, Organic oxygen compounds, Physical properties, Halogenated hydrocarbons, Polymerization, Propionic acid, Fatty acids, Copolymerization

CONTENTS: Terminology and nomenclature. Historical development. Nitroso rubber chemistry (monomer synthesis, polymerizations, pilot plant set -up, basic polymer property studies). Properties of nitroso rubber. Compounding studies. Future and potential uses of nitroso rubber.

AD-632 287 **See Fld. 11/9**

11/11, SOLVENTS, CLEANERS AND ABRASIVES

AD-632 104 **See Fld. 7/4**

11/12. WOOD AND PAPER PRODUCTS

AD-632 514 Fld. 11/12, 20/13
CFSTI Prices: HC $1.00 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
INSULATIVE PERFORMANCE OF SELECTED ABLATIVE MATERIALS IN A LOW ENTHALPY HYPERSONIC AIRSTREAM,
by J. B. Carman Jr.. May 66, 22p. Rept. no. AEDC-TR-66-26,
Contract AF 40 (600)-1200, Proj. ARO-VC0647,
Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Wood, *Thermal insulation), (*Ablation, Materials), Hypersonic flow, Enthalpy, Heat shields, Phenolic plastics, Angle of attack, Model tests, Surface temperatures

Tests were conducted to investigate the insulative performance of selected ablative materials when exposed to a relatively low enthalpy hypersonic airstream. Samples of cork, an elastomeric shield material, phenolic glass containing a buton resin, and phenolic glass, mounted on the surface of a sharp flat plate, were injected into a Mach 10 airstream at 15- and 25-deg angles of attack. The model was tested at a high free-stream Reynolds number, 2,200,000 per foot, to produce turbulent flow over the samples. The test results, which consisted of back surface temperature histories on the 0.15-in. -thick samples, showed that cork provided the greatest heat protection. (Author)

AD-632 504 **See Fld. 13/4**

Field 12-MATHEMATICAL SCIENCES

12/1. MATHEMATICS AND STATISTICS

AD-631 863 Fld. 12/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
HEBREW UNIV JERUSALEM (ISRAEL)
ON CONCATENATIVE DECOMPOSITIONS OF REGULAR EVENTS.
Technical rept.,
by B. Peleg, and A. Paz. Aug 65, 29p. Rept. no. TR-20,
Contract N62558-3882 Proj. NR-049-140,
Unclassified report

Prepared in cooperation with Technion Israel Inst. of Tech., Haifa.

Descriptors: (*Automata, *Mathematical logic), Set theory, Israel

The notion of a decomposition state, introduced by the authors in their previous work on ultimate and symmetric definite automata, is generalized and utilized with a view to a canonical decomposition for regular events. Various possible decomposition types of regular events are introduced and discussed. (Author)

AD-631 869 Fld. 12/1
CFSTI Prices: HC $8.70 MF $2.50
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
TEN PLACE TABLES OF THE JACOBIAN ELLIPTIC FUNCTIONS.
Scientific rept.,
by Henry E. Fettis, and James C. Caslin. Sep 65, 571p. Rept. no. ARL-65-180-Pt-1,
Proj. AF-7071,
Unclassified report

Descriptors: (*Tables, *Functions), Complex variables, Integrals

The report contains ten place tables of the Jacobian elliptic functions am (u,k) sn (u,k) cn (u,k) dn (u,k), E (am (u,k)).

AD-631 990 Fld. 12/1, 20/14
CFSTI Prices: HC $2.00 MF $0.50
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

ON THE GENERAL SOLUTIONS OF COUPLED-MODE EQUATIONS WITH VARYING COEFFICIENTS.
Technical rept.,
by Yung-Sen Chen, and Akira Ishimaru. Feb 66, 38p. Rept. no. TR-103,
Contract AF 19 (628)-2763, Proj. AF-5635, Task 563502,
AFCRL 66-163

Unclassified report

Descriptors: (*Differential equations, *Approximation (Mathematics)), (*Coupling circuits, Theory), Propagation, Ferrites, Rods, Log periodic antennas

In this report a systematic mathematical method is introduced for the solution of problems involving two coupled modes in a coupled system with varying parameters. These problems involve systems of linear differential equations with varying coefficients. By the use of a linear transformation of the dependent variables and a double diagonalization process, the coupled mode equations are reduced to two decoupled Riccati equations. The final form of the general solution is obtained in terms of four varying coupling coefficients and a transform parameter. To illustrate some applications of the method, solutions of two special cases which have been solved previously by other workers are obtained. The solutions for a number of special cases, in which the varying coefficients are specified or interrelated, are also obtained. Further possible applications are indicated. (Author)

AD-632 043 Fld. 12/1
RIAS INC BALTIMORE MD
EUCLIDEAN FIBERINGS OF SOLVMANIFOLDS,
by John Stuelpnagel. 14 Apr 64, 14p. Contract DA-36-034-ORD-3471,
AROD 2603:19

Unclassified report

Availability: Published in Pacific Journal of Mathematics v15 n2 p705-17 1965. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), *Algebraic topology), Theorems

This paper is concerned with the problem of finding conditions on a solvable Lie group G and a closed subgroup H which are sufficient for G/H to have topological structure of a fiber bundle with compact base space and euclidean fiber (if this is the case, we say that G/H has a euclidean fibering). The main results are the following two theorems. Theorem 1. Let G be a connected solvable linear Lie group, and H a closed subgroup which splits in G. Then G/H has a euclidean fibering. Theorem 2. Let G be a connected solvable matrix group, and assume that G is of finite index in its algebraic group hull. Then for any closed subgroup H of G, G/H has a euclidean fibering. To the best of the author's knowledge, these are the first results on existence of such fiberings which do not require that the isotropy subgroup H have a finite number of connected components. (Author)

AD-632 044 Fld. 12/1
PRINCETON UNIV N J STATISTICAL TECHNIQUES RESEARCH GROUP
AN INTRODUCTION TO POLYSPECTRA.
Revised ed.,
by David R. Brillinger. 2 Apr 65, 24p. Contract DA-36-034-ORD-2297,NSF-GS30
AROD 1715:68

Unclassified report

Revision of manuscript submitted 13 Jul 64.

Availability: Published in The Annals of Mathematical Statistics v36 n5 p1351-74 Oct 1965. Copies to DDC users only.

Descriptors: (*Multivariate analysis, *Series), Theory, Stochastic processes, Integral transforms, Real variables

The subject of this paper is the higher-order spectra or polyspectra of multivariate stationary time series. The intent is to derive (i) certain mathematical properties of polyspectra, (ii) estimates of polyspectra based on an observed stretch of time series, (iii) certain statistical properties of the proposed estimates and (iv) several applications of the results obtained.

AD-632 193 Fld. 12/1, 5/3
PRINCETON UNIV N J
AN EXPLORATORY STUDY OF THE BI-SPECTRUM OF ECONOMIC TIME SERIES,
by M. D. Godfrey. 1964, 23p. Contract NSF-GS-551,NSF-GP-579

Unclassified report

Availability: Published in Applied Statistics v14 n1 p48-69 1965. Copies to DDC users only.

Descriptors: (*Statistical analysis, *Series), (*Economics, Statistical analysis)

AD-632 265 Fld. 12/1
STANFORD UNIV CALIF DEPT OF MATHEMATICS
COMPLEX STRUCTURES OF S (1) X S (3),
by K. Kodaira. 20 Dec 65, 5p. Contract DA-31-124-ARO (D)-151,
AROD 4323:3

Unclassified report

Availability: Published in Proceedings of the National Academy of Sciences v55 n2 p240-3 Feb 1966. Copies to DDC users only.

Descriptors: (*Algebraic topology, *Complex variables), Functional analysis, Differential geometry

AD-632 286 Fld. 12/1, 20/11
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
NUMERICAL SOLUTION OF A SYSTEM OF DIFFERENTIAL EQUATIONS APPLICATION OF THE METHOD TO THE CALCULATION OF A ROTATION SHELL,
by M. Sh. Mikeladze. 29 Apr 66, 12p. Rept. no. FTD-TT-65-1439,
TT 66-61200

Unclassified report

Unedited rough draft trans. of Prikladnaya Matematika i Mekhanika (USSR) v17 n3 p382-6 1953.

Descriptors: (*Differential equations, Numerical analysis), (*Numerical analysis, *Bodies of revolution), USSR

AD-632 322 Fld. 12/1
PISA UNIV (ITALY)
METODI ANALITICI PER VARIETA ABELIANE IN CARATTERISTICA POSITIVA CAPITOLO V (ANALYTICAL METHODS BASED ON THE ABELIAN GROUP IN POSITIVE CHARACTERISTICS) CHAPTER V,
by Iacopo Barsotti. 5 May 65, 34p. Contract AF-EOAR-29-63,AF-EOAR-42-65
AFOSR 66-0256

Unclassified report

Text in Italian; Attached summary in English.

Availability: Published in Annali della Scuola Normale Superiore di Pisa v19 (S3) n4 p481-512 1965. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), *Functions), Algebras, Rings (Mathematics), Italy

The author studies the classification of special hyper -algebras in characteristic p and bidomains by considering (Witt) covectors and bivectors. He introduces derivations in the ring of bivectors with components in bidomains and studies analytical properties of functions on a such ring. (Author)

AD-632 330 Fld. 12/1
CARNEGIE INST OF TECH PITTSBURGH PA
NON-OSCILLATION CRITERIA FOR N-TH ORDER LINEAR DIFFERENTIAL EQUATIONS,
by Zeev Nehari. 7 Jul 64, 12p. Contract AF-AFOSR-647-64,
AFOSR 66-0722

Unclassified report

Availability: Published in Duke Mathematical Journal v32 n4 p607-16 Dec 1965. Copies to DDC users only.

Descriptors: (*Differential equations, Theory)

AD-632 433 Fld. 12/1
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
A MATRIX INEQUALITY INCLUDING THAT OF KANTOROVICH,
by Bertram Mond. 1964, 6p. Rept. no. ARL-66-0055,

Unclassified report

Availability: Published in Journal of Mathematical Analysis and Applications v13 n1 p49-52 Jan 1966. Copies to DDC users only.

Descriptors: (*Inequalities, *Matrix algebra), Real numbers

AD-632 479 Fld. 12/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
MATRIX MANIPULATION BY COMPUTER: THE GENERAL SOLUTION OF LINEAR ALGEBRAIC EQUATIONS.
Technical memo.,
by John Staudhammer. 20 Apr 66, 33p. Rept. no. TM-2891/001/00,

Unclassified report

Descriptors: (*Matrix algebra, *Programming (Computers)), (*Equations, Numerical methods + procedures), Iterative methods

A computer program is described that gives the solution of a general set of M algebraic equations in N unknowns. The program reduces the given augmented matrix to an upper triangular array of K equations; a check for consistency is then made of the remaining M-K equations. Consistent sets are solved for the unique solution vector (if it exists) or for dependencies of the unknowns. The order of retention (or elimination) of the variables may be specified. At the first pass the Gauss elimination process is used to arrive at the dependencies in the unknowns; optionally the problem can be recycled to be recalculated (using the now known dependencies) by means of the method of pivotal condensation. The solution thus obtained may be further refined by iteration; two options are provided: simple iteration and Gauss -Seidel iteration. The program is arranged to provide copious intermediate printing, which can be selected either from control cards or from the computer console. The program represents an intermediate result in a sequence of programs developed to teach matrix manipulations by computer. The given version is not optimal in any sense, but was checked with a number of examples and found to perform satisfactorily. A FORTRAN II version for the Philco S-2000 computer is given. (Author)

AD-632 516 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS
STABLE SUBALGEBRAS OF LIE ALGEBRAS AND ASSOCIATIVE ALGEBRAS.
Technical rept.,
by Stanley Page, and R. W. Richardson,Jr.. May

66, 22p. Rept. no. TR-28,
Contract Nonr-477 (15), Proj. NR-043-186,
Unclassified report

Descriptors: (*Algebras, Theory), Algebraic geometry, Functions, Real numbers, Stability

A subalgebra S of a Lie algebra L = (V, micro) is stable if S remains a subalgebra under small deformations of L. It is shown that S is stable if H (2) (S,V) = O. In particular, a semi-sample subalgebra of a Lie algebra is stable. The proof uses primarily the implicit function theorem. The proof is extended to the case of Lie algebras over algebraically closed fields and to associative algebras. (Author)

AD-632 519 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
DESIGN OF EXPERIMENTS FOR PARAMETER ESTIMATION IN MULTIRESPONSE SITUATIONS.
Technical rept.,
by Norman R. Draper, and William G. Hunter.
Jan 66, 20p. Rept. no. TR-63,
Contract Nonr-1202 (17),NSF-GP-2755 Proj. NR-042-222,
Unclassified report

Descriptors: (*Experimental design, *Statistical analysis), Sampling, Chemical engineering

A criterion is developed for the choice of n experimental runs in multiresponse situations, after N runs are already available. The criterion is applied to three examples involving two particular nonlinear multiple response models and the results are discussed.

AD-632 526 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
SOME METHODS FOR CLASSIFICATION AND ANALYSIS OF MULTIVARIATE OBSERVATIONS,
by James B. MacQueen. Mar 66, 31p. Rept. no. WMSI Working Paper-96,
Contract Nonr-233 (73), Proj. NR-047-003,
Unclassified report

Descriptors: (*Multivariate analysis, *Combinatorial analysis), Statistical distributions, Optimization

This paper describes a number of applications of the 'k-means', a procedure for classifying a random sample of points in E sub N. The procedure consists of starting with k groups which each consist of a single random point, and thereafter adding the points one after another to the group whose mean each point is nearest. After a point is added to a group, the mean of that group is adjusted so as to take account of the new point. Thus at each stage there are in fact k means, one for each group. After the sample is processed in this way, the points are classified on the basis of nearness to the final means. The portions which result tend to be efficient in the sense of having low within class variance. Applications are suggested for the problems of non-linear prediction, efficient communication, non-parametric tests of independence, similarity grouping, and automatic file construction. The extension of the methods to general metric spaces is indicated. (Author)

AD-632 535 Fld. 12/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
TWO-ACTION COMPOUND DECISION PROBLEMS.
Technical rept.,
by M. V. Johns,Jr.. 11 Mar 66, 35p. Rept. no. TR-87,
Contract Nonr-225 (53), Proj. NR-042-002,
Unclassified report

Descriptors: (*Decision theory, *Quality control), Acceptability, Sequences

Asymptotically optimal methods are given for deciding between two alternative actions in situations such as those occurring in routine lot by lot acceptance sampling where essentially the same decision problem arises repeatedly and accumulated past information can be used to advantage. A linear cost structure is used and no assumptions are made concerning the existence of a priori probability distributions of the relevant unknown parameters. Procedures are given which take advantage of empirical dependencies appearing in the sequences of unknown parameter values. Rates of convergence to optimality are obtained. (Author)

AD-632 590 Fld. 12/1
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF MATHEMATICS
A CHARACTERIZATION OF WEAK CONVERGENCE,
by Maurice Sion. 26 Sep 63, 10p. Contract AF-AFOSR-62-261,
AFOSR 65-0355
Unclassified report

Availability: Published in Pacific Journal of Mathematics v14 n3 p1059-67 1964. Copies to DDC users only.

Descriptors: (*Measure theory, *Topology), Sequences

AD-631 850 **See Fld. 11/6**

AD-631 860 **See Fld. 9/2**

AD-631 942 **See Fld. 22/2**

AD-632 011 **See Fld. 13/8**

AD-632 097 **See Fld. 20/4**

AD-632 205 **See Fld. 6/13**

AD-632 222 **See Fld. 20/4**

AD-632 236 **See Fld. 13/8**

AD-632 244 **See Fld. 9/2**

AD-632 373 **See Fld. 20/10**

12/2. OPERATIONS RESEARCH

AD-631 832 Fld. 12/2
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ON THE FOUNDATIONS OF STOCHASTIC PROCESSES,
by C. D. Firestone. Aug 64, 69p. Rept. no. TG-598,
Contract NOw-62-0604-c,
Unclassified report

Descriptors: (*Stochastic processes, Theory), Functions, Measure theory, Probability

A detailed and rigorous exposition is given of the foundations of stochastic processes defined in terms of probability measure over function space. It is assumed that the reader is familiar with the elements of the calculus of classes and with Lebesgue integrals, but otherwise the paper is self-contained. The development ends with the definition of separability and a demonstration of the need for such a concept. (Author)

AD-631 929 Fld. 12/2, 13/2, 7/1
CFSTI Prices: HC $1.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL TECHNOLOGICAL INST
CHANCE-CONSTRAINED GENERALIZED NETWORKS,
by Abraham Charnes, Michael J. L. Kirby, and William M. Raike. Mar 66, 15p. Rept. no. Systems research memo-149,
Contract Nonr-1228 (10),DA-31-124-ARO (D)-322 Proj. NR-047-021,
Unclassified report

Descriptors: (*Linear programming, Management engineering), (*Sanitary engineering, Management engineering), Design, Stochastic processes, Chemical engineering, Systems engineering

An extension to the theory of linear programming over generalized networks is presented which replaces the generalized Kirchoff node conditions by chance constraints. The extension is motivated by a class of problems in sanitary and chemical engineering in which the non-zero entries in the generalized incidence matrix may be random variables. Duality relationships are established for appropriate pairs of such chance-constrained programming problems by showing that their deterministic equivalents consist of a deterministic generalized network problem and its dual. It is also shown how these duality relationships may be exploited in order to obtain actual solutions to chance-constrained generalized network problems. (Author)

AD-631 975 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV BERKELEY CENTER FOR RESEARCH IN MANAGEMENT SCIENCE
A NOTE ON MAXIMAL POINTS OF CONVEX SETS IN L SPACES.
Technical rept.,
by Roy Radner. Jan 66, 12p. Rept. no. TR-22,
Contract Nonr-222 (77), Proj. RR-003-07-01,
Task NR-047-029,
Unclassified report

Descriptors: (*Convex sets, Mathematical programming), (*Functional analysis, Convex sets), Topology, Decision theory, Inequalities

AD-632 015 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA
REMARKS ON THE LIFTING PROPERTY AND THE DISINTEGRATION OF MEASURES.
Technical rept.,
by C. Ionescu Tulcea. Jun 65, 19p. Contract DA-31-124-ARO (D)-288, Proj. DA-20014501B14C,
AROD 5254:8
Unclassified report

Descriptors: (*Measure theory, *Functional analysis), (*Mapping (Transformations), Measure theory), Algebras, Topology, Theorems

Contents: On a theorem of G. Mokobodzski; Remark concerning the disintegration of measures; and Decomposition into ergodic parts.

AD-632 054 Fld. 12/2, 5/1, 14/1
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
DISCRETE OPTIMIZATION VIA MARGINAL ANALYSIS,
by Bennett Fox. Apr 66, 15p. Rept. no. P-3288-1,
Unclassified report

Prepared for submission to Management science.

Descriptors: (*Optimization, *Management planning), Scheduling, Cost effectiveness, Mathematical programming

Discrete optimization subject to one constraint is attacked by Lagrangian analysis. Incremental allocation schemes are given that generate undominated allocations. In an important special case,

the complete family of undominated allocations is generated. (Author)

AD-632 107 Fld. 12/2, 5/1
CFSTI Prices: HC $1.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL TECHNOLOGICAL INST
SOME SPECIAL P-MODELS IN CHANCE-CONSTRAINED PROGRAMMING.
Systems research memo.,
by Abraham Charnes, and Michael J. L. Kirby.
Aug 65, 23p. Rept. no. SRM-135,
Contract Nonr-1228 (10),DA-31-124-ARO (D)-322 Proj. NR-047-021,
Unclassified report

Descriptors: (*Mathematical programming, *Model theory), (*Decision theory, Mathematical programming), Management engineering

Sufficient conditions are derived for decision rules to be optimal for two classes of n-period P-models of chance-constrained programming. It is shown that the optimal rule for period j is the optimal piecewise linear function of the decision rules of previous periods and certain fractile points. The optimal class of rules is shown to be the same for the n-period P-model as for the corresponding n-period E-model. (Author)

AD-632 121 Fld. 12/2
CFSTI Prices: HC $8.60 MF $0.75
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
THE TANGENT SEARCH METHOD OF CONSTRAINED MINIMIZATION.
Technical rept. (Research paper),
by Roger R. Hilleary. 17 Mar 66, 88p. Rept. no. TR/RP-59,
Unclassified report

Descriptors: (*Search theory, *Mathematical programming), Optimization, Algorithms

This paper describes an adaptation of the Direct Search Method which is designed to find the local minimum of an arbitrary, explicitly-stated function of more than one variable, subject to arbitrary, non-linear constraints. This is sometimes called the general problem of mathematical programming. The algorithm given here usually performs its exploratory procedure in hyperplanes approximately tangent to the constraint hypersurfaces when the base point is in the vicinity of such boundaries. Therefore, the author designates it the 'Tangent Search Method'. Calculation of the partial derivatives of a constraint function is necessary when it is violated. However, the method never requires evaluation of any derivative of the objective function. Performance of Tangent Search on various test problems discussed in this paper is generally superior or similar to results with three other recently-published algorithms. (Author)

AD-632 149 Fld. 12/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
REACHABILITY OF SUBSPACES.
Revised ed.,
by Peter L. Falb. 23 Jul 65, 3p. Rept. no. JA-2555,
Contract AF 19 (628)-5167,
ESD TDR-66-48
Unclassified report

Revision of manuscript submitted 19 Mar 65.

Availability: Published in IEEE Transactions on Automatic Control vAC-10 n4 p472-3 Oct 1965. Copies to DDC users only.

Descriptors: (*Control systems, Trajectories), (*Functional analysis, Control systems), Matrix algebra

The question of whether or not a given k-dimensional subspace V or R sub n is reachable by trajectories of a linear control system is examined in this paper. (Author)

AD-632 174 Fld. 12/2
CFSTI Prices: HC $4.60 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
MONTE CARLO INVESTIGATION OF THE PROBABILITY DISTRIBUTIONS OF DIXON'S CRITERIA FOR TESTING OUTLYING OBSERVATIONS.
Memorandum rept.,
by Walter L. Mowchan. Jan 66, 50p. Rept. no. BRL-MR-1716,
Unclassified report

Descriptors: (*Monte Carlo method, *Statistical tests), Statistical distributions

An empirical or Monte Carlo method for determining the distribution of Dixon-type sample statistics for testing outlying observations is presented. Results are tabulated for samples generated from a normal distribution and for samples generated from a uniform distribution. The method employed was to select random samples of sizes n = 5, 10, 15 and 20 from each of the aforementioned distributions. After ordering the sample values such that X sub 1 < X sub 2 . . . . < X sub n, six different statistics for each sample size for each distribution were computed. A sampling distribution was therefore obtained empirically for each sample size for each distribution after 500 such sample trials. Finally, the upper alpha probability levels or percentage points are tabulated for each sample size for each distribution. (Author)

AD-632 260 Fld. 12/2, 9/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON ONE PROBLEM OF THE SYNTHESIS OF OPTIMUM CONTROL WITH LIMITATIONS PLACED ON PHASE COORDINATES AND THE RATE OF CHANGE OF THE CONTROLLING ACTION,
by V. P. Cheprasov. 28 Jan 66, 19p. Rept. no. FTD-MT-64-315, TT 66-61197
Unclassified report

Edited machine trans. of Aviatsionnyi Institut, Kazan. Trudy (USSR) v75 p91-101 1963.

Descriptors: (*Control systems, Optimization), Synthesis, Stability, Dynamic programming, USSR

The problem is considered of the analytical designing of regulators for systems with a prescribed property of exponential stability on the average. The control is constructed with help of the optimum Lyapunov function. The method of dynamic programming, developed by N. N. Krasovskiy for determinate and stochastic systems, is used.

AD-632 292 Fld. 12/2
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
ON THE EXISTENCE OF LYAPUNOV FUNCTIONS FOR THE PROBLEM OF LUR'E.
Revised ed.,
by K. R. Meyer. 30 Apr 65, 11p. Contract DA-31-124-ARO (D)-270,AF-AFOSR-693-64
AROD 5145:2
Unclassified report

Revision of manuscript submitted 14 Jan 65.

Availability: Published in J. SIAM Control (SerA) v3 n3 p373-83 1966. Copies to DDC users only.

Descriptors: (*Control systems, *Optimization), Functional analysis, Algebra, Theory

AD-632 361 Fld. 12/2, 20/4
CFSTI Prices: HC $4.00 MF $1.00
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
ON THE EXISTENCE OF SOLUTIONS OF TI STEADY-STATE NAVIER-STOKES EQU TIONS FOR A CLASS OF NON-SMOOT BOUNDARY DATA.
Technical rept.,
by James E. Edwards. Jun 63, 151p. Rept. no. 6-90-63-70,
Unclassified repo

Descriptors: (*Partial differential equation *Boundary value problems), Fluid mechanic Numerical analysis

AD-632 365 Fld. 12/2, 9/2, 8/2
CFSTI Prices: HC $2.00 MF $0.50
NEW YORK UNIV N Y LAB FOR ELECTR SCIENCE RESEARCH
PATTERN ANALYSIS OF PLANAR GEOM TRIC CONFIGURATIONS.
Final rept., 1 Jan-31 Dec 65,
by Herbert Freeman. 31 Dec 65, 35p. Contract AF-AFOSR-24-65, Proj. AF-9769, Task 976902,
AFOSR 66-0776
Unclassified repo

Descriptors: (*Pattern recognition, *Gr phics), (*Digital computers, Graphics), Ope ations research, Mathematical models, Ma ping, Scheduling, Curve fitting, Programmi (Computers), Mathematical programmin Communication systems, Delay circuits, To pology

This report describes the results of a researc study in pattern analysis and related topics. Th study covered six separate investigations. Thes were (1) quantization of line-drawing data, (2) mathematical model for contour maps, (3) the two dimensional hidden-line problem, (4) the segmen fitting problem, (5) the optimum two-dimensiona allocation problem, and (6) a study of two-wa communication between computers with interfe ence delay. The report briefly summarizes the i vestigations and lists the publications resultin from the research work. (Author)

AD-632 402 Fld. 12/2, 9/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
AUTOSATE,
by O. T. Gatto. Jan 64, 19p. Rept. no. P-2646-1
Unclassified repor

Prepared for presentation at the Annual Technica Symposium (3rd) sponsored by the San Francisc Bay Area Chapter of ACM, November 1, 1963. See also AD-430 136, AD-622 744.

Descriptors: (*Operations research, Automa tion), (*Data processing systems, Analysis), Flow charting, Data, Reports, Information retrieval, Computers

AUTOSATE is the acronym for an automated data systems analysis technique that is carried out in three phases: (1) documenting system data flows through interviews, in much the same manner as conventional system analysis is performed, (2) controlling, editing, and translating the system spe cifications into a machine-readable form, and (3) preparing a series of analysis reports by computer. AUTOSATE differs from the usual system analysis in one major respect. The area of analysis is segmented into stations rather than applications. Stations are the nodes in a data system network in which data activity in and out as well as information retained at a station are identified. Depending upon the purpose of the analysis, a station can be a person, a group of people, a specific thing such as an aircraft, or a general thing such as a flight line. (Author)

AD-632 426 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
MICHIGAN UNIV ANN ARBOR

A DISCUSSION OF SIDE PAYMENTS IN COOPERATIVE GAMES; ON THE APPLICABILITY OF MIXED STRATEGIES; AND ON AN INTERVENTION GAME.
by Bezalel Peleg. 30 Mar 66, 13p. Rept. no. 37701-1-T,
Contract DA-ARO (D)-31-124-G767 Proj. DA-5447-17,
AROD 5447:1
Unclassified report

Descriptors: (*Game theory, Optimization)

The first paper discusses side payments in cooperative games; necessary and sufficient conditions for the exitence of transferable utilities are derived. The second paper contains a description of a method which enables a player, in a game in normal form, to hide his pure strategy, which is determined by an optimal (mixed) strategy. The third paper is a remark on a class of differential games. (Author)

AD-632 478 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
STATISTICAL APPROACH FOR VALIDATING SIMULATION MODELS BY COMPARISON WITH OPERATIONAL SYSTEMS-ILLUSTRATED FOR TRAFFIC FLOW.
Professional paper,
by A. V. Gafarian, and John E. Walsh. 24 Feb 66, 20p. Rept. no. SP-2367,
Unclassified report

Descriptors: (*Operations research, *Mathematical models), Traffic, Models (Simulations), Cal/bration, Statistical processes

Development of computerized simulations including random elements is sometimes desired for types of systems that are operational for special cases. Then, the suitability of a prospective simulation model can be checked for these special cases. That is, some of the important kinds of properties for these systems can be compared for agreement. The simulation model is unsatisfactory when there is too much disagreement. The first step is to decide on the properties to be compared. Suitable standardization is important for obtaining comparisons that are both feasible and valid. The next step is to quantitatively determine how decisions on comparisons would be made if the properties considered, or their representative values (for example, expected values), were exactly determined. Finally, statistical methods are developed for making these comparisons on the basis of observed values for these properties. When the simulation is of a random nature but the cost of a run is relatively small, expected values of the properties can be almost exactly determined for the simulation model. This is accomplished by repeating simulations a very large number of times. Nonparametric methods, including asymptotic considerations, furnish the basis for the statistical methods. An example pertaining to traffic flow is used to illustrate the overall approach. (Author)

AD-632 525 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
A MARKOVIAN ALGORITHM FOR STRICTLY CONCAVE PROGRAMMING WITH LINEAR CONSTRAINTS,
by Arthur M. Geoffrion. Mar 66, 15p. Rept. no. WMSI Working Paper-98,
Contract Nonr-233 (75), Proj. NR-047-041,
Unclassified report

See also AD-619 768.

Descriptors: (*Algorithms, *Linear programming), Probability, Quadratic programming, Optimization

Theil and van de Panne have shown how to replace the problem of maximizing a (strictly concave) quadratic function subject to linear inequality constraints by a finite sequence of sub-problems involving only linear equality constraints. In another paper, the author generalized this approach to (i) cover the case of a differentiable and strictly concave objective function, and (ii) permit almost complete flexibility in the choice of the initial sub-problem. The last feature seems essential for the approach to be of computational interest, for computational experience suggests that the number of sub-problems that must be solved and the amount of computer storage required to keep track of them have a tendency to grow approximately exponentially with the 'poorness' of the choice of the initial sub-problem. In this paper a modification of the above approach is proposed which generates the sub-problems in Markovian fashion. This all but eliminates the storage problem. Although the resulting sequence of sub-problems is no longer necessarily finite, by means of the theory of Markov chains it is shown that eventual convergence to the optimum is assured with probability one and argued that the expected number of sub-problems that must be solved increases only approximately linearly with the 'poorness' of the initial sub-problem. Computational evidence is given which supports this estimate and suggests the probable efficiency of the Markovian algorithm even for quite 'bad' choices of the initial sub-problem. (Author)

AD-632 553 Fld. 12/2
CFSTI Prices: HC $6.00 MF $1.25
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
THE THEORY AND APPLICATION OF LINEAR OPTIMAL CONTROL.
Final rept.,
by Edmund G. Rynaski, and Richard F. Whitbeck. Jan 66, 210p. Rept. no. 1H-1943-F-1,
Contract AF 33 (615)-1541, Proj. AF-8219,
Task 821904,
AFFDL TR-65-28
Unclassified report

Descriptors: (*Control systems, Synthesis), (*Optimization, Control systems), Theory

Linear optimal control theory has produced an important synthesis technique for the design of linear multivariable systems. In the present study, efficient design procedures, based on the general optimal theory, have been developed. These procedures make use of design techniques which are similar to the conventional methods of control system analysis. Specifically, a scalar expression is developed which relates the closed-loop poles of the multi-controller, multi-output optimal system to the weighting parameters of a quadratic performance index. Methods analogous to the root locus and Bode plot techniques are then developed for the systematic analysis of this expression. Examples using the aircraft longitudinal equations of motion to represent the object to be controlled are presented to illustrate design procedures which can be carried out in either the time or frequency domains. Both the model-in -the-performance-index and model-following concepts are employed in several of the examples to illustrate the model approach to optimal design. (Author)

AD-631 836 See Fld. 9/3

AD-631 839 See Fld. 9/2

AD-631 937 See Fld. 5/3

AD-631 943 See Fld. 5/3

AD-632 068 See Fld. 15/5

AD-632 230 See Fld. 9/5

AD-632 481 See Fld. 5/1

AD-632 491 See Fld. 5/10

AD-632 495 See Fld. 5/3

AD-632 499 See Fld. 5/3

AD-632 524 See Fld. 5/10

Field 13-MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13/1. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-632 050 See Fld. 13/2

AD-632 124 See Fld. 20/13

AD-632 219 See Fld. 13/13

AD-632 237 See Fld. 17/8

13/2. CIVIL ENGINEERING

AD-632 050 Fld. 13/2, 13/1, 10/1
CFSTI Prices: HC $1.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
WATER PRODUCTION IN A POLAR ICE GAP BY UTILIZATION OF WASTE ENGINE HEAT.
Technical rept.,
by Frank L. Russell. Dec 65, 22p. Rept. no. TR-168,
Task 1V025001A13001,
Unclassified report

Descriptors: (*Water supplies, Arctic regions), (*Power plants (Establishments), Arctic regions), Diesel engines, Exhaust gases, Heat exchangers, Heat, Reclamation, Ice, Snow, Melting, Water, Dams, Underground structures, Civil engineering, Mechanical engineering

The results are discussed of the useful reclamation of heat from engine exhaust gas and coolant, which is normally rejected into the atmosphere and wasted, for the production of domestic water and for space and water heating. During the period of occupancy of the Tuto ice tunnel and under-ice camp (Greenland), domestic water was produced and stored in a subterranean reservoir beneath the floor of a cross-drift in the ice 40 ft from the no1theast wall of the power-plant building. Energy to produce water by melting the reservoir perimeter was supplied by rejected heat from one of two D 13,000 Caterpillar diesel engines driving a 75-kw 120/240-v generator which supplied camp electrical requirements. The power supply and heat exchange system are described. (Author)

AD-631 929 See Fld. 12/2

AD-631 949 See Fld. 8/12

AD-632 198 See Fld. 13/13

13/3. CONSTRUCTION EQUIPMENT, MATERIALS AND SUPPLIES

AD-632 198 See Fld. 13/13

13/4. CONTAINERS AND PACKAGING

AD-632 092 Fld. 13/4
CFSTI Prices: HC $2.00 MF $0.50
UNITED STATES RUBBER CO MISHAWAKA IND
LINERS FOR HIGH PRESSURE AIR STORAGE VESSELS.

Quarterly progress rept. no. 5, 1 Jan-1 Apr 66,
by E. C. Uhlig, V. A. Falkenau, and R. C. Kohrn.
1 Apr 66, 37p. Contract NObs-92150, Proj. SR-007-03-04, Task 1008,
Unclassified report

Descriptors: (*Filament wound construction, *Storage tanks), (*Pressure vessels, Storage tanks), Air, Laminates, Feasibility studies

AD-632 504 Fld. 13/4, 6/6, 11/9, 11/12, +
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
FACTORS IN THE DEVELOPMENT OF FUNGUS-PROOF BARRIER MATERIALS. I. TREATMENTS FOR KRAFT PAPER. II. PLASTIC AND ASPHALT LAMINATES.
Technical research articles,
by Sidney H. Ross, and Leonard Teitell. 1966, 28p. Rept. no. A66-5,
Proj. DA-1C024401A329,
Unclassified report

Availability: Published in Developments in Industrial Microbiology, v7 p179-200 1966. Copies to DDC users only.

Descriptors: (*Fungusproofing, *Containers), (*Paper, Fungusproofing), (*Laminated plastics, Fungusproofing), (*Asphalt, Fungusproofing), Fungicides, Fungus deterioration, Packaging, Wood, Storage, Polyethylene plastics, Preservation, Resistance (Biological)

Treatments for Kraft Paper: Six commercial fungicides were added to kraft paper and fungus resistance determined by soil burial and agar surface methods. Influence of aqueous leaching and storage at elevated temperature on fungus resistance of treated papers was determined. It was found that fungus resistance is dependent on the concentration per unit area of the sheet, not on concentration of fungicide per unit weight. A number of fungitoxic compounds were compared for protection provided paper. Effects of molds (originating from wood containers) on adjacent kraft paper or barrier material liners were investigated. Liners made of fungicidally treated paper remained in good condition even though growth was present on adjacent untreated wood surface. Untreated kraft paper or barrier material used to line treated wood boxes was not deteriorated. Asphalt and Plastic Laminates: Untreated kraft paper and kraft paper treated with fungicides were made into laminates with polyethylene and tested by soil burial and agar surface methods. The polyethylene layers had only a very slight effect on delaying or decreasing microbial attack on the untreated paper, but did aid in further inhibiting fungal deterioration of treated paper. If a fungicide was added to the asphalt but not the paper, there was complete protection against fungi even though no fungicide was added to the asphalt. (Author)

AD-632 573 Fld. 13/4
CFSTI Prices: HC $24.30 MF $1.25
NATIONAL BUREAU OF STANDARDS BOULDER COLO CRYOGENIC ENGINEERING LAB
OPTIMUM DESIGN OF LIQUID OXYGEN CONTAINERS.
Technical rept.,
by Robert W. Arnett, Keith A. Warren, and Lewis O. Mullen. Aug 61, 247p. Contract AF 33 (616)-56-15, Proj. AF-8610,
WADC TR-59-62
Unclassified report

Previously announced 20 Mar 62 as PB-181 108 $3.50.

Descriptors: (*Tanks (Containers), *Liquefied gases), (*Oxygen, Tanks (Containers)), Design, Optimization, Physical properties, Thermal insulation, Materials, Construction, Instrumentation

The basic parameters influencing the design of liquid oxygen containers are considered and their design interrelation evaluated. Factors considered include materials, configuration, insulation, support members, instrumentation, valves, piping, weight, evaporation loss, and accessory items such as vacuum pumps and transfer hoses. Means for evaluating and optimizing the combination of the various factors are presented together with experimental work conducted in areas where information was lacking. Description of the design and construction of a liquid oxygen container together with the thermal test results on the container is included. (Author)

13/6. GROUND TRANSPORTATION EQUIPMENT

AD-632 270 Fld. 13/6, 5/3
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
INDIAN TRANSPORTATION: A SECTORAL APPROACH TO DEVELOPMENTAL CONSTRAINTS,
by Alan Carlin. Apr 66, 36p. Rept. no. P-3284,
Unclassified report

See also AD-615 947.

Descriptors: (*India, Transportation), Economics, Railroads, Roads, Costs, Government (Foreign), Commerce, Money, Foreign aid

The mode-by-mode analysis of Indian transportation has turned up two principal problems, the likelihood of unnecessary investment in the railroads due to an inappropriate rate structure and discrimination against highway transportation. Generalizations can be made as to the underlying reasons for these and other transportation problems discussed. Perhaps two themes can be discerned. One is the continuing position of dominance that the Railways have been able to maintain in many areas by virtue of the fact that they are a well established government ministry rather than the economic merits of their services. The other is the conflicting transportation policies pursued by different branches of the Indian Government. While the general country constraints have a role to play in formulating broad development strategy, there is sufficient difference between them and the more specific problems brought out to suggest the importance of sectoral analyses of constraints. The importance of such a sectoral analysis for developing a policy for administering foreign aid to transportation is evidence; studies of a number of sectors will also greatly aid in reaching valid conclusions about the more general constraints on Indian development. (Author)

AD-631 949 **See Fld. 8/12**

AD-632 245 **See Fld. 8/13**

AD-632 391 **See Fld. 1/3**

AD-632 521 **See Fld. 19/3**

AD-632 570 **See Fld. 1/3**

13/7. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-632 393 Fld. 13/7
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THE FREQUENCY RESPONSE OF BLOCKED PNEUMATIC LINES.
Master's thesis,
by James Thomas Karam Jr.. Mar 66, 125p.
Rept. no. GAM/ME/66B-3,
Unclassified report

Descriptors: (*Pneumatic systems, Physical properties), Frequency, Resonance, Gain, High frequency, Transmission lines, Theory, Control systems, Nomographs, Cylindrical bodies

The amplitude frequency response (transfer gain curve) of 0.170 inch I.D. blocked pneumatic lines of the type used in flueric systems was experimentally determined. The ecectric-pneumatic analog was used, in conjunction with a 'gain envelope' technique, to develop theoretical predictions of the gain curves of blocked pneumatic lines by several theories. Correlation with experiment showed that any theory using a constant pneumatic resistance would be in error when the signal frequency was greater than a characteristic frequency of the line. A high-frequency theory, based on the work of Nichols (The linear properties of pneumatic transmission lines, 'Transactions of the American Society of Mechanical Engineers', no. 2, 79:583-874 (1957)), was developed and, at least, predicted the resonant gains within 2 db and the resonant frequencies within 10 per cent for all signal sizes. A rapid nomographic solution for the gain curve, based on this high-frequency theory, is included. (Author)

AD-632 396 Fld. 13/7, 20/1
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
A STUDY OF THE EFFECTS OF ENVIRONMENTAL NOISE ON THE PERFORMANCE OF FLUID AMPLIFIERS.
Master's thesis,
by Charles Jasper Hansen. Mar 66, 39p. Rept. no. GAM/ME/66A-5,
Unclassified report

Descriptors: (*Fluid amplifiers, *Noise), Performance (Engineering), Stability, Pressure, Audiofrequency, Sound, Hysteresis, Jets

The effects of environmental noise on the static performance of two bistable fluid amplifiers were studied. Plots of differential control pressure versus differential output pressure were made by varying input pressure to one control. In addition to sound frequency and pressure level, variables considered included amplifier configuration, orientation, and supply pressure. Tests were run at frequencies of 100, 200, 500, 1000, and 2000 cps and sound pressure levels ranging from 151 to 157 db. The effects noted varied widely and included decreased hysteresis, instability, and complete loss of bistable characteristics. The phenomena of jet spreading, radiation pressure, and acoustic streaming were related to these effects. (Author)

13/8. INDUSTRIAL PROCESSES

AD-631 952 Fld. 13/8
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB
CHEMICAL MILLING OF ALLOY STEELS,
by Sara J. Ketcham. 9 Mar 66, 23p. Rept. no. NAEC-AML-2418,
Task RRMA-02-011/200-1/F020-01-01,
Unclassified report

Descriptors: (*Chemical milling, *Steel), Hydrogen embrittlement, Stress corrosion, Fracture (Metallurgy), Surface properties

Experiments were conducted to determine the effect of chemical milling on susceptibility of high strength steels to hydrogen embrittlement and stress corrosion cracking. Alloys studied included H-11, 4340 and 17-7 PH. Results indicated that the acid baths used for chemical milling do initially embrittle these alloys, but recovery of ductility takes place at room temperature within one week if there is no barrier to the escape of hydrogen (such as a plating). A recovery treatment of 48 hours at room temperature followed by 4 hours

at 375F is recommended. A high strength steel with a chem-milled surface is more susceptible to stress corrosion cracking than one with a machine ground surface. (Author)

AD-632 004 Fld. 13/8, 11/6
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
FATIGUE OF PLATES AND WELDMENTS IN HIGH STRENGTH STEELS.
Quarterly rept. for 1 Dec 65-28 Feb 66, Mar 66, 36p. Contract NObs-94232, Proj. SF-020-01-05, Task 729-0,
Unclassified report

Descriptors: (*Steel, *Welds), (*Fatigue (Mechanics), Steel), Metal plates, Welding, Fracture (Mechanics), Microstructure

Studies were made on the fatigue behavior of HY-100 weldments and weldments in HY-130/150 steel. The physical properties and chemical compositions of the base metals are presented. The fatigue data for both materials were obtained using axially loaded transverse butt-welded specimens in the as-welded condition. Details of the test specimens are given. The net width at the test section was determined by the test stress cycle and the capacity of the fatigue machines. A MIL-12018 electrode was used for the HY-100 transverse butt-welded specimens currently under investigation. The fatigue tests were conducted on zero-to-tension stress cycles; the results are compared with data from similar tests of the HY-100 material welded with a MIL-11018 electrode. Metallurgical examinations of HY-130/150 weldments prepared with each of two welding procedures were made and the results are reported. Preliminary fatigue test data are reported for transverse butt-welded specimens using the two welding procedures.

AD-632 011 Fld. 13/8, 12/1, 14/4
CFSTI Prices: HC $5.00 MF $1.00
AMERICAN POWER JET CO RIDGEFIELD NJ
GUIDE FOR DEVELOPMENT OF STATISTICAL TECHNIQUES FOR DEFINING SIGNIFICANT VARIABLES AFFECTING PRODUCT QUALITY AND RELIABILITY,
by George Chernowitz, Samuel J. Bailey, and Angelo W. Castellon. Jun 64, 175p. Rept. no. APJ-376-1,
Contract NObs-88629, Proj. SR-003-05-03, Task 10432,
Unclassified report

Descriptors: (*Quality control, *Statistical analysis), (*Reliability, Engineering), Naval equipment, Manufacturing methods, Design

AD-632 177 Fld. 13/8, 11/3
CFSTI Prices: HC $2.00 MF $0.50
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
THE LOCKSPRAY-GOLD PROCESS.
Technical data bulletin,
by D. J. Levy. Apr 66, 38p. Rept. no. 6-76-66-9,
Unclassified report

Descriptors: (*Plating, *Gold), (*Sprays, Gold), Reduction (Chemistry), Gold compounds, Oxidation-reduction reactions, Metal films, Reflectivity, Spray nozzles, Deposition, Spacecraft, Heat transfer, Optical coatings

The LOCKSPRAY-GOLD (Registered trademark of Lockheed Aircraft Corp.) process is a new method for plating gold with the use of conventional spray guns. It is a chemical reduction process in which separate aqueous solutions of a complex gold salt and a chemical reductant are sprayed simultaneously at ambient temperature onto the article to be coated. Plating conditions have been designed so that a dense continuous gold film is formed by an autocatalytic deposition mechanism. The coatings produced are high purity gold. The process can be used to deposit gold on almost any solid material including plastics, glass, metals, and ceramics. Appearance of the gold depends on the surface roughness of the substrate. The specular reflectivity of a mirror is obtained when plating on smooth or polished surfaces. Gold deposited on a rough surface exhibits a dull or matte appearance.

AD-632 236 Fld. 13/8, 12/1
CFSTI Prices: HC $2.00 MF $0.50
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J STATISTICS CENTER
TWO-STAGE CHAIN SAMPLING INSPECTION PLANS WITH DIFFERENT SAMPLE SIZES IN THE TWO STAGES.
Technical rept.,
by K. S. Stephens, and H. F. Dodge. Apr 66, 41p. Rept. no. TR-N-23,
Contract Nonr-404 (18), Proj. NR-042-241,RR-003-05-01
Unclassified report

See also AD-629 432.

Descriptors: (*Quality control, *Statistical analysis), (*Sampling, Quality control), Sequential analysis, Operations research, Probability

This report presents a further generalization of the family of 'two-stage' chain sampling inspection plans--the use of different sample sizes in the two stages. Plans presented in previous reports specify the use of the same sample size in both stages. Evaluation of the operating characteristics is accomplished by the Markov chain approach developed in the preceding reports. Markov chains for a number of plans are included and several algebraic solutions are developed. Since these plans involve a variable amount of sampling, an evaluation of the average sample number (ASN) is developed. OC curves are presented and discussed for plans with acceptance numbers, C sub 1, C sub 2 = 0,1; 0,2, 1,2; and 0,3, 1,3 and sample sizes, n sub 1, n sub 2 = 10,5; 20,10; and 200,100. ASN curves for the same plans for n sub 1, n sub 2 = 200,100 are also presented. Then to compare the two-sample-size plans with plans having only one sample size, OC curves for a number of each of these types of plans are presented. Comparisons indicate that improved discrimination is achieved by the two-sample-size plans. (Author)

AD-632 364 Fld. 13/8, 9/1
CFSTI Prices: HC $1.00 MF $0.50
AEROPROJECTS INC WEST CHESTER PA
ULTRASONIC WELDING PROCESS AND EQUIPMENT FOR CONSTRUCTION OF ELECTRON-TUBE MOUNTS.
Quarterly progress rept. no. 14, 1 Oct-31 Dec 65, by J. G. Thomas. 31 Dec 65, 16p. Contract DA-36-039-sc-86741,
Unclassified report

See also AD-631 489.

Descriptors: (*Utrasonic welding, *Electron tube parts), Leakage (Electrical), Machines, Welding, Production

Fabrication of a second sample lot of 100 type 6080WB electron tube mounts was successfully completed. Of 175 tube mounts started, 118 were completed up to the bulbing and basing operations. The final connection in the assembly sequence (snubbers to snubber support rods) was made by resistance welding, in order to utilize the more fragile alumina spacer now used in the 6080WB electron tube. The incidence of short circuits between the grid laterals and the cathode sleeve was eliminated by insertion of a steel mandrel in the cathode sleeve prior to welding. (Author)

AD-632 518 Fld. 13/8, 13/9
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF STATISTICS
THE EFFECT OF EXPERIMENTAL ERROR ON THE DETERMINATION OF THE OPTIMUM METAL-CUTTING CONDITIONS.
Technical rept.,
by S. M. Wu, and D. S. Ermer. Jan 66, 31p.
Rept. no. TR-61,
Contract Nonr-1202 (17), Proj. NR-042-222,
Unclassified report

Prepared in cooperation with Pennsylvania State Univ., University Park, Dept. of Mechanical Engineering.

Descriptors: (*Cutting tools, Life expectancy), (*Machining, Economics), Errors, Statistical analysis, Optimization, Decision theory, Velocity, Cost effectiveness, Costs, Game theory

Conclusions: The effect of experimental error on the determination of the minimum-cost cutting speed was investigated using the concept of statistical inference. The theoretical cutting speed for minimum cost (V (min)) is not uniquely defined, but lies within a probable range of speeds because of the uncertainty in the parameter-estimates of the tool-life equation. The confidence interval for V,(min) depends on the magnitude of the cost-time parameter t sub e; as t sub e increases, the V (min) confidence interval decreases. The confidence interval for V (min) is affected by the experimental range of feed in tool-life testing; the smallest confidence interval is at the average experimental feed. A decision rule based on the minimax principle is used to illustrate the selection of a specific speed from within the V (min) confidence interval. (Author)

AD-631 955 See Fld. 9/1

AD-632 072 See Fld. 11/6

AD-632 079 See Fld. 9/1

AD-632 081 See Fld. 11/6

AD-632 229 See Fld. 9/1

AD-632 355 See Fld. 11/6

AD-632 363 See Fld. 9/1

AD-632 421 See Fld. 9/1

AD-632 455 See Fld. 14/2

AD-632 504 See Fld. 13/4

AD-632 535 See Fld. 12/1

AD-632 538 See Fld. 11/9

13/9. MACHINERY AND TOOLS

AD-632 493 Fld. 13/9
CFSTI Prices: HC $3.00 MF $0.75
SKF INDUSTRIES INC KING OF PRUSSIA PA RESEARCH LAB
A BASIC STUDY OF THE SLIDING CONTACTS IN ROLLING BEARINGS (PROJECT II).
Quarterly progress rept. no. 4, 16 Jan-15 Apr 66, by C. J. Belsky, M. Cocks, and W. E. Schmidt. 15 Apr 66, 86p. Rept. no. AL66L026,
Contract NOw-65-0182-f, Proj. SKF-18-7, 19-1
Unclassified report

See also AD-628 052.

Descriptors: (*Antifriction bearings, *Friction), Surface temperatures, Films, Ball bearings, Measurement, Fluid dynamic properties, Lubrication, Tests, Configuration, Gaskets, Roller bearings

A study was made of the kinematics of a flat washer to roller test configuration.

AD-632 585 Fld. 13/9, 20/11, 17/7
CFSTI Prices: HC $1.00 MF $0.50
ARMY WEAPONS COMMAND ROCK ISLAND ILL
KINEMATICS OF A TRACKING GIMBAL,
by Wright K. Gannett. 1966, 17p.
Unclassified report

Descriptors: (*Gimballs, Mechanics), Tracking, Weapon systems, Servomechanisms, Mathematical analysis, Target acquisition

This paper presents formulas for angular displacements, velocities, accelerations, and torques required about the individual axes of a two-axis gimbal system in which a tracking device swivels universally in error-free tracking of any specified tactic of an unaccelerated target. These formulas apply, for example, to missile and satellite trackers, theodolites, optical sights of weapons, and -- by extension -- to the weapon itself, displaced through a lead angle. The target can move in any direction through space, air, water, or on the ground. The gimbal system is carried on an unaccelerated platform and the pintle may be oriented any fixed spatial direction. The effect of target tactics on the choice of gimbal orientation is discussed, particularly in its effects on smoothness and speed of tracking. (Author)

AD-632 518 **See Fld. 13/8**

13/10. MARINE ENGINEERING

AD-631 927 Fld. 13/10
CFSTI Prices: HC $4.00 MF $1.00
UNDERWATER STORAGE INC WASHINGTON D C
SPECIFICATIONS FOR A PROTOTYPE BUOYANT VESSEL FOR UNDERSEA EXPLORATION.
15 Jan 66, 72p. Contract NBy-63878,
Unclassified report

Descriptors: (*Underwater vehicles, *Oceanographic vessels), (*Marine engineering, Underwater vehicles), Deep submergence, Pressure vessels, Spheres, Buoyancy, Construction, Materials, Quality control, Metallography, Specifications, Mechanical drawings, Experimental design

The general purpose for constructing the buoyant vessel covered within this specification is to demonstrate the feasibility of a new buoyancy control concept. The vessel is to fulfill the following performance characteristics: (1) Produce approximately 1000 pounds net buoyant force as indicated on the weight-buoyancy table, using helium as the pressurizing gas. In addition to the 1000 pounds, an allowance of 160 pounds shall be included in the total weight of the vessel for the use of certain black box items to be added at a later time. (2) Construction of the pressure vessels shall be accomplished under commercial code limits with a safety factor of 3.5 to 1 to attain the operating pressure given in the weight buoyancy table. (3) The buoyant vessel shall function as a free floating, unmanned and untethered device. (4) Approximately 60 to 180 minutes will be allowed for descent to and ascent from the operating depth.

AD-632 341 Fld. 13/10
CFSTI Prices: HC $5.00 MF $1.00
BUREAU OF SHIPS WASHINGTON D C
DESIGNING OF SEA-GOING VESSELS,
by L. M. Nogid. Jan 66, 170p. Rept. no. Trans-964,
TT 66-61209
Unclassified report

Trans. of mono. Proektirovanie Morskikh Sudov, Leningrad 1964 p22-170.

Descriptors: (*Ships, Design), USSR, Weight, Loading (Mechanics), Center of gravity, Ballast, Buoyancy, Equations, Mathematical analysis, Stability

Contents: conversions of a vessel's indexes based on a prototype at complete and provisional similarity of vessels being compared; vessel load and weight measuring devices; position of a vessel's center of gravity. Initial trimming and ballasting of vessels under operating conditions; equation of weights.

AD-632 460 Fld. 13/10
CFSTI Prices: HC $1.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
LIFTING LINE THEORY OF A HYDROFOIL OF ARBITRARY SHAPE MOVING IN SHALLOW WATER,
by G. A. Goshev. Jan 66, 14p. Rept. no. Trans-966,
TT 66-61221
Unclassified report

Teoriya Nesushcheii Linii Podvodnogo Kryla Proizbolnoi Formy na Melkovodye, trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n3 p29-38 1964.

Descriptors: (*Hydrofoils, Lift), Theory, Water, Hydrodynamic configurations, Mathematical analysis, Motion, USSR

The report contains the solution of the space problem of an even movement of an underwater wing of finite dimension in shallow water. The shape of the wing in a plane which is perpendicular to the movement, and its disposition in relation to the free surface are assumed to be arbitrary. Used as the basis of the solution were the lifting line theory of Prandtl and linear limit conditions on a free surface.

AD-632 604 Fld. 13/10, 11/9
CFSTI Prices: HC $4.00 MF $1.00
BUREAU OF SHIPS WASHINGTON D C
SECURING MACHINERY IN PLASTIC VESSELS,
by Iu. V. Razdrogin. Mar 66, 148p. Rept. no. Trans-963,
TT 66-61238
Unclassified report

Kreplenie Mekhanizmov na Sudah iz Plastmass, trans. of mono. Sudostroenie, Leningrad, 1965.

Descriptors: (*Ships, *Plastics), Machines, Marine engineering, Ship structural components, Foundations (Structures), Glass textiles, Mechanical fastners, Flanges, Joining, Hulls (Marine)

The book examines the methods for securing machinery in plastic ships. It describes briefly the materials used in the building of plastic ships, and the existing constructions of foundations. It describes experiments of securing machinery to foundations and expounds a methodology for the calculation of securing machinery and of other saturation in plastic ships. It describes the technology of premoulding foundations to plating of hull in plastic ships, of mounting the securing of machinery and of other saturation. It examines problems quality control of materials and those of techniques for safety in working with fiberglass. (Author)

AD-632 008 **See Fld. 8/10**

AD-632 072 **See Fld. 11/6**

AD-632 302 **See Fld. 1/3**

AD-632 498 **See Fld. 9/3**

AD-632 603 **See Fld. 20/6**

13/11. PUMPS, FILTERS, PIPES, TUBING AND VALVES

AD-632 126 Fld. 13/11
CFSTI Prices: HC $4.00 MF $1.00
PAYNE (PETER R) INC ROCKVILLE MD
STEADY-STATE THRUST AUGMENTORS AND JET PUMPS.
Final rept. Jun 65-Feb 66,
by Peter R. Payne. Mar 66, 135p. Contract DA-44-177-AMC-337 (T) Task 1P125901A01409, USAAVLABS TR-66-18
Unclassified report

Descriptors: (*Thrust augmentor nozzles, State -of-the-art reviews), (*Jet pumps, State-of-the-art reviews), Performance (Engineering)

The state of the art in steady-state augmentors and jet pumps is briefly reviewed and a general performance theory developed. Generalized charts are presented giving the augmentation ratio obtainable from an optimized eductor, together with the associated geometrical and fluid-dynamic parameters. This theory is shown to give good agreement with experiment. Experimental measurements made by various investigators in the past do not achieve the predicted optimum performance, however, because of various deviations from optimum design in their test eductors. The performance of eductors in an axial stream and the total head rise obtainable through an eductor are both investigated theoretically. The report concludes with a brief survey of various unconventional eductors, including multistage units, Coanda eductors and crypto-steady flow devices. (Author)

AD-632 436 Fld. 13/11, 20/4, 21/7
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
CAVITATION TESTS WITH A HIGH EFFICIENCY SHEAR FORCE PUMP,
by S. H. Hasinger, L. G. Kehrt, and O. T. Goksel. 1964, 18p. Rept. no. ARL-66-0054,
Unclassified report

Prepared in cooperation with Technical University, Ankara, (Turkey).

Availability: Published in Cavitation in Fluid Machinery ASME p132-47 1965. Copies to DDC users only.

Descriptors: (*Pumps, Design), Cavitation, Force (Mechanics), Stability, Shear stresses, Fluid flow

The shear force pumping principle promises high operational stability and favorable cavitation behavior, particularly in the low specific speed regime. Tests carried out so far verify these claims to a large degree. (Author)

AD-632 498 **See Fld. 9/3**

AD-632 605 **See Fld. 13/13**

13/12. SAFETY ENGINEERING

AD-632 366 Fld. 13/12, 15/3
CFSTI Prices: HC $3.00 MF $0.75
STANFORD RESEARCH INST MENLO PARK CALIF
FIELD NOTES ON WORLD WAR II GERMAN FIRE EXPERIENCE,
by Carl F. Miller, and James W. Kerr. Oct 65, 76p. Contract N228- (62479)65419, Proj. SRI-MU-5070,
Unclassified report

Prepared in cooperation with Office of Civil Defense, Washington, D. C.

Descriptors: (*Fires, History), West Germany, Urban areas, Fire safety, Casualties, Food, Water supplies, Water, Wounds + injuries

To obtain and preserve available basic data on World War II fires in Germany, the authors visited

(under the United States Office of Civil Defense sponsorship) key locations and authorities in Germany and the United Kingdom in February and March 1965. This report describes the locations and authorities visited and summarizes the types of recorded data that were found, as well as the results of conversations during the visit. Data gathered remain the property of the United States: they will be collated at Stanford Research Institute and will serve as input to future analytical studies by the Office of Civil Defense and its contractors. (Author)

AD-632 111 See Fld. 19/1

13/13. STRUCTURAL ENGINEERING

AD-631 848 Fld. 13/13
CFSTI Prices: HC $3.00 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
DEADMAN ANCHORAGES IN VARIOUS SOIL MEDIUMS.
Final technical rept. Sep 62-Mar 65,
by J. E. Smith, and J. V. Stalcup. Apr 66, 74p.
Rept. no. TR-R-434,
Proj. Y-F015-15-01-010,
Unclassified report

Descriptors: (*Anchors (Structural), Loading (Mechanics)), Soils, Sands, Concrete, Soil mechanics, Graphics, Experimental data, Tests

A test program was conducted to investigate deadman anchorage holding capacities under applied horizontal loads. Deadmen fabricated of concrete and ranging in face area from 5 to 72 square feet were tested in depths of embedment from ground level to 7 feet. The deadmen were pulled both singly and in groups of three, in sand and in two soils with cohesive characteristics. The test program also included tests on a model scale. The applied load versus horizontal displacement relationship exhibited a basic recognizable form for all conditions of tests. By graphic analysis, a series of reaction-pattern curves was developed relating deadman holding power in each cohesive soil to three factors: deadman face area, depth of embedment, and whether the deadmen were embedded singly or in a group. The investigation disclosed that multiple anchors develop a higher holding capacity per net area than a single deadman with the same total face area. The increase in holding capacity ranging from 5 to 20% depends upon such factors as depth of embedment, the type of soil, and the spacing between deadmen. Under most test conditions, up to 30% increase in holding capacities was attained in cohesive soils as compared to sand, but 2 to 3 times the horizontal displacement was required to achieve the maximum holding capacity. (Author)

AD-632 198 Fld. 13/13, 8/12, 13/2, 13/3
CFSTI Prices: HC $4.00 MF $0.75
COLORADO SCHOOL OF MINES RESEARCH FOUNDATION INC GOLDEN
MECHANICS OF PENETRATION OF PILES INTO PERMAFROST.
Final rept. (technical),
by Jacques Charest, Phillippe Duler, and John S. Rinehart. Sep 65, 108p. Contract DA-11-190-eng-92,
CRREL TR-122
Unclassified report

Descriptors: (*Soil mechanics, Permafrost), (*Permafrost, *Foundations (Structures)), (*Civil engineering, Permafrost), Polar regions, Soils, Penetration, Supports, Rods, Explosive actuators, Rockets, Tests, Experimental data

Laboratory and field tests have been conducted to determine the feasibility of using rockets for driving piles. Phase I consisted of driving hollow circular model piles into artificial permafrost using guns. Measured parameters were the penetrations and impact velocities of piles having various masses and various external and internal diameters. The main purpose of Phase II was the measurement of parameters in order to find a physical meaning of the empirical equation developed in Phase I. The field test program consisted of driving thin, hollow, full-size piles into natural permafrost using a rocket as the driving agent, and measuring the same parameters as in Phase I. The results indicate that the use of rockets is technically feasible. It is estimated that a 6 in. nominal diameter pile of 0.56-in. wall thickness could be driven 6 to 8 ft into permafrost by a 100,000 lb thrust rocket having an 80 msec burning duration. To resist collapse upon impact with the permafrost, the pile should have either a reinforcement shoe or a minimum wall thickness of 0.56 in. A design of an integrated pilerocket assembly meeting these requirements is proposed. (Author)

AD-632 219 Fld. 13/13, 13/1
CFSTI Prices: HC $5.00 MF $1.25
IIT RESEARCH INST CHICAGO ILL TECHNOLOGY CENTER
EXPERIMENTAL EVALUATION OF SIMULATED HEAT AND MOISTURE LOADS IN SHELTERS.
Final rept.,
by Alexander Goldsmith. Dec 65, 185p. Rept. no. M6116,
Contract OCD-OS-62-227, Proj. DA-1200, Task 1210,
Unclassified report

Descriptors: (*Fallout shelters, *Cooling + ventilating equipment), (*Humidity, Fallout shelters), (*Atmospheric temperature, Fallout shelters), Ventilation, Simulation, Soils, Analysis of variance, Physical properties

An experimental program was carried out to determine the variation of temperatures inside a fallout shelter, and in the surrounding soil, under conditions of simulated occupancy. Variables investigated included the ventilation rate, and the size and shape of the shelter structure. The experimental shelters had floor areas of 21 x 21, 21 x 7, and 7 x 7 ft., all with a 7-ft. ceiling height, and were loaded with 45, 15, and 5 simulated occupants respectively. Each shelter was ventilated at constant rates of 0, 3, 7, and 15 cfm per occupant for periods up to two weeks. The supply air was maintained at a constant dew-point temperature of 69F and a dry-bulb temperature that varied sinusoidally between 75 and 95F each day. Detailed test data are given for the variation of temperatures with time and location. (Author)

AD-632 605 Fld. 13/13, 13/11
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C
AXISYMMETRIC STRESSES IN ORTHOTROPIC, WEB-STIFFENED SANDWICH CYLINDERS LOADED WITH UNIFORM EXTERNAL PRESSURE.
Final rept.,
by James A. Nott. Apr 66, 35p. Rept. no. 1859,
Proj. S-F013-03-02, Task 1956,
Unclassified report

Descriptors: (*Sandwich construction, *Stresses), Pressure, Stiffened cylinders, Submarine hulls, Plastics

An analysis is developed for determining stress distributions in orthotropic, web-stiffened sandwich cylinders loaded with external uniform pressure. This analysis is particularly applicable to sandwich pressure hulls for deep-diving submarines, which are constructed with glass-reinforced plastics. The separate values of Poisson's ratio and Young's modulus along the three principal orthogonal axes of the cylinders are used in the equilibrium equations. Graphs are presented to enable rapid determination of hyperbolic and trigonometric stress coefficients. (Author)

Field 14-METHODS AND EQUIPMENT

14/1. COST EFFECTIVENESS

AD-631 942 See Fld. 22/2

AD-632 054 See Fld. 12/2

AD-632 472 See Fld. 14/5

14/2. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-631 854 Fld. 14/2, 20/13, 11/6, 14/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
DEVICE FOR METALLOGRAPHIC AND RADIOGRAPHIC INVESTIGATIONS OF SOLIDS DURING DEFORMATION AT LOW TEMPERATURES,
by I. A. Gindin, and Ya. D. Starodubov. 30 Mar 66, 11p. Rept. no. FTD-TT-65-1510, TT 66-61135
Unclassified report

Unedited rough draft trans. of mono. Novye Mashiny i Pribory Dlya Ispytaniya Metallov. Sbornik Statei, n.p. 1963 p116-8.

Descriptors: (*Deformation, Instrumentation), (*Metallography, Instrumentation), (*Radiography, Instrumentation), Low-temperature research, Cryogenics, Surface properties, Loading (Mechan/cs), X-ray photography, Cooling, Heating, USSR

For studying the phenomena which take place at low-temperature deformation, a setup was devised which permits taking observations, photographs, and moving pictures of the changes in the relief on the surface of a specimen directly during the time of its cooling, low-temperature loading, and subsequent heating. The apparatus was intended also for X-ray investigation of processes which occur in solids on cooling, heating, and low-temperature deformation. The design of the device enabled one to cool the specimen to the temperature of about 10K, measure this temperature, and deform the specimen by extension and compression with simultaneous recording along the points of a 'load-deformation' diagram. (Author)

AD-631 933 Fld. 14/2, 20/4
CFSTI Prices: HC $4.00 MF $0.75
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
INSTRUMENTATION AND CALIBRATION OF UTIAS 11 IN. X 15 IN. HYPERSONIC SHOCK TUNNEL.
Technical note,
by Y. Y. Chan, R. P. Mason, and N. M. Reddy. Jun 65, 101p. Rept. no. UTIAS-TN-91,
Contract AF-AFOSR-365-65, AFOSR 66-0002
Unclassified report

Descriptors: (*Hypersonic flow, *Shock tubes), Hypersonic wind tunnels, Hypersonic nozzles, Combustion, Explosive gases, Explosion gases, Shock waves, Control systems, Calibration, Schlieren photography, Aerodynamics, Gas flow

An outline of the problems encountered in the calibration of the UTIAS 11 in. x 15 in. Hypersonic Shock Tunnel and some of the solutions are presented. An impulsively heated tungsten-wire technique was successfully developed to obtain detonation-free, smooth, and very repeatable combustion by burning stoichiometric mixtures of oxygen and hydrogen, diluted with helium. It was found

that tailored shock Mach numbers as high as M sub s = 9.5 were achieved. A test section flow calibration was done by measuring wall static pressures, pitot pressures and stagnation point heat-transfer rates. Qualitative pressure-time histories of static and pitot pressures obtained from theoretical considerations were used to interpret the experimental data as well as the nozzle starting time and testing times. Schlieren pictures of the flows over a flat plate and a right circular cylinder are also presented. Methods of predicting the test-section flow quantities in the different flow regimes are indicated. Nozzle starting processes are explained by utilizing available theories. The reservoir and test section conditions were usually P sub o -- 30 atmospheres to 90 atmospheres; T sub o -- 3000K to 4500K; sub o = 1.00 to 1.35; P sub infinity - 0.003 to 0.02 psi, P sub x - 0.1 to 0.8 psi, M sub infinity =8.0 to 13.8, Relft = 1.5 x 10 to the 4th to 3.82 x 10 to the 3rd (based on flow field behind the shock). (Author)

AD-631 957 Fld. 14/2
CFSTI Prices: HC $3.00 MF $0.75
NAVAL RESEARCH LAB WASHINGTON D C
HYPERVELOCITY CAPABILITY AND IMPACT EFFECT PROGRAM.
Memo rept. (final),
by H. F. Swift, and J. R. Baker. Mar 66, 61p.
Rept. no. NRL-MR-1677,
Contract ARPA Order-70,

Unclassified report

Descriptors: (*Light gas guns, Scientific research), (*Hypervelocity guns, Scientific research), Hypervelocity projectiles, Acceleration, Hydrogen, Gases, Molecular weight, Pressure, Temperature, Velocity

Two approaches to the development of high performance accelerators were investigated. The first approach utilized pulses of electrical energy to heat small chambers of low molecular weight gas to high pressures. The maximum projectile velocities attained from the expansion of this gas did not exceed the velocities which were concurrently being achieved with compression type light-gas guns. The second approach was a continuance of the development of the conventional light-gas gun utilizing gas heating techniques and optimization of gun parameters. Comparisons are made between real gas and ideal gas on the effects of gas temperature and pressure on sound speed, efflux velocity, and maximum flow velocity for steady and nonsteady conditions. At peak gas pressures (above 6.8 kilobars) the performance of a light-gas gun could be increased by decreasing the temperature profile of the driver gas. All attempts to increase maximum projectile velocities in optimized NRL light-gas guns by pre-heating the driver gas were unsuccessful. (Author)

AD-631 977 Fld. 14/2
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
SIMPLE DIFFERENTIAL PUMPING STAGE FOR CONNECTING HIGH TO ULTRAHIGH-VACUUM SYSTEMS,
by E. V. Kornelsen, and B. Domeij. 14 Jun 65, 6p.
NRC 8834

Unclassified report

Availability: Published in The Journal of Vacuum Science and Technology v3 n1 p20-4 Jan-Feb 1966. Copies to DDC users only.

Descriptors: (*Vacuum pumps, Molecular beams), Chemisorption, Nitrogen, Titanium, Films, Surface properties, Low-pressure research, Evaporators, Controlled atmospheres

Measurements have been made of the nitrogen pressure ratio across a connecting stage as a function of the nitrogen exposure on the high-pressure side. The stage consisted of a titanium evaporator in a spherical glass bulb (8-cm diameter) which was connected to two glass ultrahigh vacuum systems via short axially aligned tubes. When an unobstructed straight line path was allowed between the two systems, at least 99% of the transmitted gas was the direct 'streaming' component which did not encounter the titanium surface. For the particular design reported here, the resulting pressure ratio was 33,000. When the streaming path was obstructed, pressure ratios as high as 3 x 10 to the 7th power were measured. Saturation of the chemisorption on the evaporated titanium occurred at about 8 x 10 to the 14th power molecules per sq cm of macroscopic area. A single evaporator containing 0.12 g of titanium was able to deposit more than 300 films. Expressions are given from which the performance of other stages of similar design but of different dimensions can be estimated. (Author)

AD-632 062 Fld. 14/2
CFSTI Prices: HC $6.00 MF $1.50
NAVAL BOILER AND TURBINE LAB PHILADELPHIA PA
FLOW METERING.
Final research and development rept.,
by C. Gregory. 17 Oct 63, 297p. Rept. no. NBTL-A-367,
Proj. SF013-06-20, Task 3950,

Unclassified report

Descriptors: (*Flowmeters, Fluid flow), (*Fluid flow, Measurement), Data, Tables, Air, Steam, Water, Standards, Orifices, Venturi tubes, Nozzles, Equations

This report presents methods and physical data for accurately calculating the rate of flow through head or kinetic type meters, constructed and installed in accordance with the current Instrument Standards issued by the Naval Boiler and Turbine Laboratory. Flow coefficient data are presented for standard pressure tap locations and physical data for air, steam and water. By use of standard forms, precise calculations can be made without prior knowledge of fluid flow theory. Assumptions of Reynolds number and successive approximation are unnecessary. All methods are in strict agreement with current American Society of Mechanical Engineers practices and physical data are based on the most authoritative sources available. (Author)

AD-632 078 Fld. 14/2, 20/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
CONDITION NECESSARY FOR A LINEAR RELATIONSHIP BETWEEN ION CURRENT AND DEPOSITION RATE.
Technical rept.,
by John G. Bennett. 4 May 65, 17p. Rept. no. NAFI-TR-554,

Unclassified report

Descriptors: (*Ionization gages, Calibration), (*Ionic current, Ionization gages), Evaporation, Vapors, Deposition, Films, Substrates, Thickness, Measurement

A mathematical study of the ionization rate monitor is made to establish the relationship between the ion current in the rate sensor and the rate of deposition of film upon a substrate. This relationship is necessary for designing a thickness monitor which indicates the time integral of deposition rate. If the deposition rate were proportional to the ion current, then the ion current could be directly integrated electronically to indicate the thickness of the deposited film; but if the deposition rate were a non-linear function of the ion current, then the ion current would have to be fed into a circuit that would perform certain operations upon the ion current that would give an output, proportional to deposition rate, which could then be integrated electronically. The mathematical condition necessary for the ion current in the evaporation rate monitor to be proportional to the deposition rate is found and shown to be satisfied. The limitations of the analysis are discussed. (Author)

AD-632 085 Fld. 14/2, 20/4
CFSTI Prices: HC $2.00 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
CALIBRATION OF THREE VENTURI AIR FLOW METERING SYSTEMS WITH STING MOUNTED CENTERBODIES AT CRITICAL AND SUBCRITICAL FLOW CONDITIONS.
Technical rept.,
by H. E. Wolff. May 66, 32p. Rept. no. AEDC-TR-66-52,
Contract AF 40 (600)-1200, Proj. AF-3066,ARO-RB-041

Unclassified report

Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Flowmeters, Calibration, Venturi tubes, Gas flow, Reynolds number, Tests, Temperature, Configuration

An experimental investigation was conducted to determine the discharge coefficient of a venturi airflow meter with various diameter centerbodies installed. A critical flow venturi for which a theoretical discharge coefficient had been experimentally verified was used as the calibration standard. The discharge coefficients for the test venturi without centerbody and with centerbodies of two different diameters were determined over a range of venturi throat Reynolds numbers from 320,000 to 3,200,000 at a constant inlet air total temperature of 70F. The experimentally determined coefficients were in good agreement with the theoretical value for all configurations tested. Maximum deviation (0.3 percent) of discharge coefficient from the theoretical value occurred with the venturi without centerbody operating at critical flow conditions. (Author)

AD-632 194 Fld. 14/2
DIAMOND ORDNANCE FUZE LABS WASHINGTON D C
AN AUTOMATIC MICROWAVE PHASE COMPARATOR.
Revised ed.,
by J. A. Kaiser, H. B. Smith, W. H. Pepper, and J. H. Little. 27 Aug 62, 5p.

Unclassified report

Revision of manuscript submitted 22 Jun 62.

Availability: Published in IRE Transactions on Microwave Theory and Techniques vMTT10 n6 p548-50 Nov 1962. Copies to DDC users only.

Descriptors: (*Comparators, *Microwaves), (*Phase meters, Microwaves), Automatic, Power dividers, Passive, Microwave frequency

A method for passively measuring the phase angle between two signals of the same frequency is described. While simple in concept, the system has no ambiguities throughout 360 degrees and is independent of relative signal amplitudes because phase angle is displayed orthogonally to amplitude. Consisting principally of two hybrids with detectors and an X-Y indicator, the system contains no moving parts or active phasing devices. In addition to making routine phase measurements, it can be readily applied to automatic direction finders, polarization analyzers, and impedance plotters. (Author)

AD-632 197 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
A MINIATURE PULSE GENERATOR,
by K. G. Williams. 21 Oct 65, 16p. Rept. no. NOLTR-62-165,
Proj. NOL-396,

Unclassified report

Descriptors: (*Pulse generators, Miniature electronic equipment), Transistors, Portable, Sound generators, Sonar, Sonar pulses, Gates (Circuits)

The circuit details and operation of a compact solid-state pulse generator are discussed. Besides its portability, the generator features a wide range of repetition rates, time delays, and pulse widths. It produces well-shaped rectangular pulses having rise and fall times of 25 nanoseconds each. Pulse delays and widths are available from 1 microsec to 1 sec with repetition rates from 0.2 to 25,000 cycles per second. Amplitude is continuously variable from zero to -10 volts. (Author)

AD-632 207 Fld. 14/2, 20/9, 20/3, 20/4
CFSTI Prices: HC $5.60 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
HEAT TRANSFER EFFECTS ARISING FROM ARC ROTATION IN PLASMA ARC HEATERS OF THE SELF-INDUCED MAGNETIC FIELD TYPE.
Technical memo.,
by E. A. Bunt. Dec 65, 54p. Rept. no. TG-759,
Contract NOw-62-0604-c,
Unclassified report

Descriptors: (*Plasma jets, *Electric arcs), Magnetic fields, Heat transfer, Electrodes, Enthalpy, Aerodynamic characteristics, Vortices, Rotation, Temperature, Reynolds number, Radiation (Heat transfer), Convection (Heat transfer)

The paper is concerned with an analysis of the thermal behavior of high input power (about 15 megawatt) arc heaters operating at values of total (bulk) enthalpy up to 2500 Btu/lb. The electrode system is essentially a 'rail accelerator' adapted for continuous operation by making it re-entrant; the self-induced magnetic field brings about rapid movement of the arc roots to prevent destruction of the electrodes. The rate of rotation of the arc column (which is subject to aerodynamic drag) is shown to be a function of apparent electrode gap and current and the stagnation temperature and pressure in the arc chamber. A distinction can also be drawn between 'long' and 'short' arcs, depending on whether the interelectrode gap is large or small. The value of the arc rotation rate (which ranges between about 50 and 1000/sec) had a considerable bearing on the thermal efficiency of short-gap arcs because of the dependence of the convective losses on it. (Author)

AD-632 234 Fld. 14/2
CFSTI Prices: HC $2.60 MF $0.50
AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO
DESCRIPTION OF THE 120-INCH HYPERSONIC SHOCK TUNNEL AND ANTICIPATED PERFORMANCE,
by Philippe O. Bouchard, and Harold F. Chambers,Jr.. Jan 66, 30p. Rept. no. afapl-TR-65-129, Proj. AF-3012, Task 301201,
Unclassified report

Descriptors: (*Hypersonic wind tunnel, *Shock tubes), Performance (Engineering), Hydrogen, Helium, Shock waves, Surface properties, Operation, Ramjet engines

A 120-inch hypersonic shock tunnel has been installed in the Air Force Aero Propulsion Laboratory to provide a capability for testing advanced ramjet engine components and large-scale propulsion systems. The shock tunnel utilizes driver gases that are unheated; presently, either hydrogen or helium, pressurized to 30,000 psia, is used as the driver gas. The 'Tailored' interface technique is used to allow for maximum testing time. The facility in its present configuration yields test Mach numbers in the range 18 to 35. Modifications are being made to extend this range to approximately Mach 8 to 10. (Author)

AD-632 394 Fld. 14/2
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THIN-FILM HEAT TRANSFER GAGES.
Master's thesis,
by John William Frye,Jr.. Mar 66, 80p. Rept. no. GAM/ME/66A-3,
Unclassified report

Descriptors: (*Heat transfer, *Meters), Films, Platinum, Paints, Quartz, Substrates, Calibration, Operation

An extensive literature survey on thin-film heat transfer gages was accomplished and pertinent references are listed. Methods and techniques for fabricating, calibrating, and using thin-film gages are discussed. Thin-film gages were fabricated using liquid platinum paint applied to a quartz backing material, and were calibrated using the electrical single pulse method. Rates of heat transfer were determined for a station on the wall of a shock tube for the laminar boundary layer flow condition immediately after shock wave passage for shock Mach numbers between 1.15 and 2.50. The variation of the wall surface temperature with time associated with shock wave passage was also determined. The results were correlated with theoretically predicted values and with the experimental results given by Hartunian and Weatherston. The thin-film gages constructed for this study had determined values of 1/2 square root of (pi rho kc) of 0.067 plus or minus 0.005 B/sq ft F square of sec, and measured values for sensitivity of resistance to temperature ranging from 0.000905 to 0.001375 ohm/ohm F. (Author)

AD-632 455 Fld. 14/2, 13/8
CFSTI Prices: HC $1.00 MF $0.50
API INSTRUMENTS CO CHESTERLAND OHIO
PRODUCTION ENGINEERING MEASURE FOR METERS, TAUT-BAND SUSPENSION, A-C MOVING IRON VANE PER SIGNAL CORPS REQUIREMENTS SCS-160.
Quarterly progress rept. no. 11, 1 Nov 65-31 Jan 66,
by R. H. Nichols. 31 Jan 66, 7p. Contract DA-36-039-AMC-01473 (E),
Unclassified report

See also AD-626 760.

Descriptors: (*Measuring devices (Electrical + electronic), Manufacturing methods), Suspension devices, Iron, Foils, Reliability, Voltmeters, Ammeters

All preproduction tests on 2 1/2-inch meters have been completed except the Group V tests on the 0-5 ampere meters. The tests were successful. Preproduction approvals have been granted for all three types of 3 1/2-inch meters. The pilot run of 3 1/2-inch, 0-2 milliampere meters has been accepted and delivered. The pilot run on 3 1/2-inch 0-150 volt meters is about 60 percent complete. (Author)

AD-632 517 Fld. 14/2, 20/4
CFSTI Prices: HC $6.00 MF $1.25
NORTH AMERICAN AVIATION INC COLUMBUS OHIO
TURBULENCE STUDY OF A TRANSONIC WIND TUNNEL AND AN ANALYSIS AND TESTS OF AIRCRAFT RESPONSE TO TURBULENCE.
Final rept.
1 Oct 64, 223p. Rept. no. NA-63H-636,
Contract NOw-61-0354-d,
Unclassified report

Descriptors: (*Transonic wind tunnels, *Turbulence), (*Airplane models, Model tests), Aerodynamic characteristics, Mathematical analysis, Subsonic flow, Damping, Stabilization systems

A theoretical technique is demonstrated for predicting the random response of a lifting surface on an aircraft traveling at high subsonic speeds through turbulent air. In addition, an evaluation is made of the suitability of a wind tunnel for buffet testing. The theoretical technique is verified by comparing theoretical and experimental values for the frequency response of the horizontal tail of an aeroelastically scaled model. The experimental frequency response was obtained from measurements of the random accelerations and the velocities of exciting turbulence. A theoretical investigation of the effects of structural damping is included. A seven by ten foot transonic wind tunnel is evaluated by presenting power spectral densities, probability densities, intensities and peak factors for the downwash and streamwise components of background turbulence. This turbulence data was measured with a hot-wire anemometer at several spatial locations in the test section and over the operating range. The evaluation is aided by comparing model tests with flight tests. (Author)

AD-632 577 Fld. 14/2, 20/8
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB
A VERSATILE HIGH PRESSURE MOSSBAUER APPARATUS,
by P. Debrunner, R. W. Vaughn, A. R. Champion, J. Cohen, and J. Moyzis. 1966, 30p. Rept. no. COO-1198-365,
Contract Nonr-1834 (05),AT (11-1)-1198
Unclassified report

Descriptors: (*Mossbauer effect, Instrumentation), High-pressure research, X-ray diffraction analysis, Calibration, Circuits

An apparatus was developed which permits high pressure Mossbauer resonance studies to 300 kilobars. It can be operated with either the source or the absorber under pressure. The pressures are established by X-ray diffraction measurements, and calibration curves are presented for both the supported taper and Bridgman anvils cells. A motion device involving magnets and phosphor bronze springs, with an adjustable mount is described. Circuits necessary to control the motion, and to distribute the signals from two devices operating in parallel are outlined. (Author)

AD-632 596 Fld. 14/2
CFSTI Prices: HC $5.00 MF $1.00
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
THEORETICAL AND EXPERIMENTAL STUDIES OF THE UNDERLYING PROCESSES AND TECHNIQUES OF LOW PRESSURE MEASUREMENT.
Final rept.
Apr 66, 153p. Rept. no. R-286,
Contract DA-28-043-AMC-00073 (E),NsG-376
Proj. DA-20014501B31F,
Unclassified report

Descriptors: (*Low-pressure research, Measurement), (*Pressure gages, Low-pressure research), Vacuum, Ionization gages, Meters, Adsorption, Upper atmosphere, Instrumentation, Test methods, Vacuum pumps

The report relates work done over the past several years in the field of low pressure measurement. Particular emphasis is placed on the development of the suppressor (Schuemann) gauge developed at this laboratory. Other work with total and partial pressure gauges is reported. Related work in surface physics is also discussed in detail. New material not reported in detail in earlier reports includes discussions of (1) pumping speeds of getter-ion pumps at low pressures and (2) bakeout procedures for small glass ultrahigh vacuum systems and reduction of O2 to CO conversion. (Author)

AD-632 598 Fld. 14/2
CFSTI Prices: HC $4.00 MF $1.00
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

RESTORATION OF THE INPUT FUNCTION IN MEASURING INSTRUMENTATION.
Technical rept.,
by Heinz Grote. Feb 66, 151p. Rept. no. ECOM-2662,
Proj. DA-1VO-14501-B-53A, Task 02,
Unclassified report

Descriptors: (*Measuring devices (Electrical + electronic), Dynamics), Operations research

The subject of this investigation is the extension of the dynamic range of a given measuring instrumentation by external means. If the output-input relation of the instrument is presented in the form of an ordinary differential equation, it is possible to restore the input far beyond the instrumental restrictions by computational means. A main operation involved in this process, differentiation, is treated from an instrumentational point of view. Examples of the input restoration for linear and nonlinear differential equations are presented. (Author)

AD-631 835 See Fld. 7/3

AD-631 838 See Fld. 11/8

AD-631 950 See Fld. 4/2

AD-631 976 See Fld. 9/5

AD-632 069 See Fld. 9/5

AD-632 080 See Fld. 8/13

AD-632 168 See Fld. 20/6

AD-632 169 See Fld. 20/6

AD-632 240 See Fld. 20/6

AD-632 314 See Fld. 11/6

AD-632 315 See Fld. 4/1

AD-632 337 See Fld. 7/4

AD-632 338 See Fld. 7/4

AD-632 547 See Fld. 4/1

14/4. RELIABILITY

AD-631 903 Fld. 14/4, 20/6
CFSTI Prices: HC $1.10 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
CONTACT MICRORADIOGRAPHY: A GENERAL SURVEY.
Technical note,
by Arne Engstrom. 1961, 10p. Rept. no. TN-5,
Contract AF 61 (514)-861,
Unclassified report

Sponsored in part by Swedish Medical Research Council and Rockefeller Foundation.

Descriptors: (*X-ray photography, Microscopy), (*Microscopes, X-ray photography), Histological techniques, X rays, Sweden

Present status of contact microradiography: The resolution possible is that of the optimal resolution of the light microscope, i.e. about 0.2 micron. The histochemical weighing technique based on contact microradiography permits the estimation of the dry mass (weight) of cellular structures as small as 10 to the -12th to-14th power grams with an error of 5-10%. Contact microradiography with monochromatic X-rays now permits the quantitative histochemical analysis of certain elements such as P,S, and Ca with relatively good accuracy, and it seems likely that this technique can be extended successfully to estimations of C, N, and O. Qualitative microradiography has found wide use in studies of capillary circulation, mineral salt distribution, metallurgical research, and other fields. (Author)

AD-631 906 Fld. 14/4, 20/6
CFSTI Prices: HC $1.60 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
HIGH-RESOLUTION CONTACT MICRORADIOGRAPHY WITH ULTRASOFT POLYCHROMATIC X-RAYS.
Technical note,
by A. Engstrom, R. C. Greulich, B. L. Henke, and B. Lundberg. 1961, 16p. Rept. no. TN-4,
Contract AF 61 (514)-861 ,PHS-D-177
Unclassified report

Research supported in part by Swedish Medical Research Council and Rockefeller Foundation.

Descriptors: (*X-ray photography, Microscopy), (*Microscopes, X-ray photography), Photographic emulsions, X rays, X-ray tubes, Histological techniques, Sweden

The purpose is to discuss the practical methods that have been employed to achieve high-resolution microradiograms of biological specimens by using polychromatic X radiation. Factors influencing microradiographic resolution are given: recording emulsion; and the geometric relationships (emulsion thickness, section thickness, and sample-emulsion 'interspace' distance. The X-ray apparatus used for making the contact (unit magnification) microradiograms is described.

AD-631 907 Fld. 14/4, 20/6, 6/16
CFSTI Prices: HC $2.60 MF $0.50
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
BIOPHYSICS OF BONE.
Technical note, 1 Oct 55-30 Sep 56,
by Arne Engstrom. 31 Oct 56, 21p. Contract AF 61 (514)-861,
Unclassified report

Descriptors: (*X-ray photography, Microscopy), (*Microscopes, X-ray photography), (*Bone, Histological techniques), X-ray diffraction analysis, X-ray diffraction cameras, Histological techniques, Calcium, Phosphorus, Strontium, Sweden

Techniques have been developed for microradiography at high resolution of thin biological specimens. Cameras utilizing monochromatic and polychromatic ultrasoft X-rays are described. Equipment for low angle X-ray diffraction studies of biological material with monochromatic X-rays is described. The techniques mentioned have been applied to the study of biophysics of bone. (Author)

AD-631 972 Fld. 14/4, 9/1
CFSTI Prices: HC $1.00 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
MICROCIRCUIT RELIABILITY PREDICTION METHODS.
Research rept. for Jul 65-Feb 66,
by H. F. Dean. 11 Mar 66, 15p. Rept. no. NEL-1347,
Proj. SF-013-14-04, Task 5786,
Unclassified report

Descriptors: (*Microminiaturization (Electronics), *Reliability (Electronics)), Circuits, Test methods, Noise (Radio), Measurement, Counting methods, Infrared radiation, Temperature, Visual inspection

A survey of possible test methods, and some exploratory work, showed that the most promising methods for the reliability screening of microcircuits are conventional electrical tests; special electrical tests such as rf noise measurement and use of the ring-counter technique; infrared temperature measurement; and visual inspection. (Author)

AD-632 011 See Fld. 13/8

AD-632 340 See Fld. 9/1

14/5. REPROGRAPHY

AD-632 122 Fld. 14/5, 8/2
CFSTI Prices: HC $3.60 MF $0.50
ARMY ENGINEER GEODESY INTELLIGENCE AND MAPPING RESEARCH AND DEVELOPMENT AGENCY FORT BELVOIR VA
PRECISION ENLARGING PRINTER (4X).
Final technical rept., May 64-Jan 65,
by Andrew J. Bondurant Jr., and Theodore L. Fick. Mar 66, 40p. Rept. no. 27-TR,
Proj. DA-4A623501-D853,
Unclassified report

Descriptors: (*Projection printers, Performance (Engineering)), (*Mapping, Projection printers), Photogrammetry, Photographic printers, Specifications, Acceptability, Tests, Military requirements

This report covers the test and evaluation of the Precision Enlarging Printer (PEP). The PEP is a 4-time-enlarging, projection-type printer designed to produce outputs with negligible distortion and extremely high resolution. The operation of the printer has been automated extensively to increase efficiency of operation as well as accuracy of the printer. Tests were conducted to determine the design and operational characteristics of the printer with primary emphasis being placed on the distortion and resolution characteristics. The report concludes that: (a) The PEP will produce outputs with an Area Weighted Average Resolution (AWΔR) of at least 150 lines/mm at the negative plane; (b) the distortion of the optical system does not exceed a Circular Probable Error (CPE) of 2.65 microns at the scale of the negative; (c) the enlarging ratio of the PEP is 3.94; (d) the rate of production with the PEP is comparable with that of other widely used similar printers; and (e) the PEP is a relatively easy instrument to operate and requires very little maintenance. (Author)

AD-632 472 Fld. 14/5, 14/1
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
PUBLICATION COST ANALYSIS TECHNIQUES.
Professional paper,
by Arthur Teplitz. 3 Mar 66, 23p. Rept. no. SP-2341/000/01,
Unclassified report

Descriptors: (*Printing, Costs), Microfiche, Microfilm, Punched cards, Distribution

The paper describes the results obtained from analyzing past printing requirements at System Development Corporation and determining alternative methods of printing, duplication, and distribution. The techniques used in determining the costs for each of the several alternative methods are described, and elements of cost discussed briefly. The techniques permit comparisons between standard offset printing methods and conventional distribution methods-aperture cards, microfiche and microfilm cartridges. (Author)

AD-631 854 See Fld. 14/2

Field 15-MILITARY SCIENCES

15/1. ANTISUBMARINE WARFARE

AD-632 008 See Fld. 8/10

AD-632 010 See Fld. 8/3

15/3. DEFENSE

AD-632 211 Fld. 15/3, 5/1
CFSTI Prices: HC $15.10 MF $1.00
URS CORP BURLINGAME CALIF
OPERATIONAL AND MANAGEMENT ASPECTS OF PERIPHERAL RADIOLOGICAL COUNTERMEASURES.
Final rept.,
by William H. Van Horn. Mar 66, 155p. Rept. no. URS-646-4,
Contract N228 (62479)65718,
USNRDL TRC-5
Unclassified report

Document includes Summary rept.

Descriptors: (*Civil defense systems, Countermeasures), (*Management planning, Civil defense systems), Radiological contamination, Fallout shelters, Shielding, Radiological dosage, Evacuation, Survival

The operational constraints and management problems associated with the planning and implementation of peripheral radiological countermeasures were investigated. The four peripheral countermeasures studied (postattack evacuation, applied shielding, dose equalization - including group shielding - and exposure scheduling) can be useful to the local civil defense organization in providing a significant degree of control over radiation exposure in the early postattack period, and their use may result in a reduction of dose to personnel and/or a decrease in the time till emergence from shelter is possible. Moreover, the flexibility in scheduling made possible by the use of peripheral countermeasures can increase the scope of lifesaving activities and permit earlier initiation of the recovery phase. The major management constraint on the use of peripheral countermeasures concerns the rapidity with which decisions can be reached so that action can be initiated. It was concluded that the degree of preattack planning deemed necessary for peripheral countermeasures can be integrated into the present civil defense organization with relatively minor difficulty, resulting in an appreciable payoff in postattack capabilities.

AD-632 366 See Fld. 13/12

15/4. INTELLIGENCE

AD-632 235 See Fld. 5/11

AD-632 595 See Fld. 6/21

15/5. LOGISTICS

AD-632 068 Fld. 15/5, 12/2
CFSTI Prices: HC $2.00 MF $0.50
COMBAT OPERATIONS RESEARCH GROUP TECHNICAL OPERATIONS INC FORT BELVOIR VA
CONTROL SYSTEM FOR DIRECTORATE OF MATERIEL REQUIREMENTS.
CORG memo.,
by Richard H. Ernst. 1 Sep 63, 31p. Rept. no. CORG-M-172,
Contract DA-19-020-ORD-5351,
Unclassified report

Descriptors: (*Management control systems, *Army equipment), Weapon systems, Operations research

This paper presents a procedure by which the Directorate of Materiel Requirements can monitor the development of major items and systems and provide the necessary control to insure that the responsibilities of the United States Army Combat Developments Command are discharged with respect to these projects. (Author)

AD-632 560 Fld. 15/5, 15/6
CFSTI Prices: HC $10.60 MF $1.00
STANFORD RESEARCH INST MENLO PARK CALIF
THE EFFECTS OF A NUCLEAR ATTACK ON RAIL ACTIVITY CENTERS,
by Paul S. Jones. Jul 61, 95p. Contract CDM-SR-CO-37, Proj. SRI-IMU-3084,
Unclassified report

Descriptors: (*Railroads, Nuclear warfare), Food, Transportation, United States, Nuclear warfare casualties, Radioactive fallout

The work reported is the result of an analysis of post-nuclear-attack railroad operation in 12 rail activity centers. The analysis has been based upon the transportation of a single commodity--food. The selected nuclear attack involved 375 4-megaton weapons directed against retaliatory bases and industrial and population centers. The determination of post-attack food transportation requirements was based on the number and location of survivors by county, or similar divisions, and the geographical configuration of surviving yards and rail lines. Interstate food shipments were traced from the point where each rail activity center would be entered to points within 5 or 10 miles of survivors. Supply routes were selected by which food deliveries could be economically made to all survivors and empty freight cars removed. Traffic patterns were established together with yard assignments and requirements for rolling stock. The capability of the rail facilities to accommodate additional traffic was also determined.

AD-631 949 See Fld. 8/12

AD-632 247 See Fld. 5/1

AD-632 376 See Fld. 5/1

AD-632 570 See Fld. 1/3

15/6. NUCLEAR WARFARE

AD-632 279 Fld. 15/6, 18/3, 18/8
CFSTI Prices: HC $6.00 MF $1.50
HUDSON INST INC HARMON-ON-HUDSON N Y
ENVIRONMENTAL EFFECTS OF NUCLEAR WEAPONS. VOLUME ONE.
Final rept. 30 Sep 64-1 Dec 65,
by Robert U. Ayres. 1 Dec 65, 286p. Rept. no. HI-518-RR-Vol-1,
Contract OCD-OS-62-218, Task 3511A,
Unclassified report

See also AD-632 280, -632 281.

Descriptors: (*Nuclear explosion damage, *Ecology), (*Nuclear warfare, Ecology), (*Nuclear weapons, Ecology), Radiation effects, Radioactive fallout, Strontium, Radioactive isotopes, Thermal radiation, Ignition, Fires, Meteorological phenomena, Micrometeorology, Epidemiology, Insects, Disease vectors, Erosion, Floods, Cesium, Iodine, Environment

Volume I summarizes current knowledge of the effects of nuclear weapons on area targets. Radiological effects are divided roughly into three categories: external gamma -radiation from fallout fields; external beta-burns and internal hazards due to cycling of Sr-90, Cs-137 and I-131. Vulnerabilities of different classes of targets or 'biomes' are considered, e.g. vertebrates, insects, conifer forests, deciduous forests, grasslands and crop lands. Thermal ignition and probabilities of fire spread under various conditions are discussed in Chapter II. Chapter III is concerned with potential meteorological and climatic problems. Chapter IV discusses a variety of 'second-order' problems such as epidemics, pest outbreaks, floods, erosion and ecological changes. (Author)

AD-632 280 Fld. 15/6, 18/3, 18/8
CFSTI Prices: HC $3.00 MF $0.75
HUDSON INST INC HARMON-ON-HUDSON N Y
ENVIRONMENTAL EFFECTS OF NUCLEAR WEAPONS. VOLUME TWO,
by Robert U. Ayres. 1 Dec 65, 87p. Rept. no. HI-518-RR-Vol-2,
Contract OCD-OS-62-218, Task 3511A,
Unclassified report

See also AD-632 281.

Descriptors: (*Nuclear explosion damage, Ecology), (*Nuclear warfare, Ecology), (*Nuclear weapons, Ecology), Radiation effects, Radioactive fallout, Agriculture, Environment, Decontamination, Food

Volume II is devoted to an analysis of the interactions of effects described in Vol. I (AD-632 781) with postattack recovery problems, particularly in connection with agriculture: The potential conflicts between short- and long -term objectives are stressed. A number of specific countermeasures are listed and discussed. (Author)

AD-632 281 Fld. 15/6, 18/3, 18/8
CFSTI Prices: HC $2.00 MF $0.50
HUDSON INST INC HARMON-ON-HUDSON N Y
ENVIRONMENTAL EFFECTS OF NUCLEAR WEAPONS. VOLUME THREE.
Summary rept.,
by Robert U. Ayres. 1 Dec 65, 30p. Rept. no. HI-518-RR-VOL-3,
Contract OCD-OS-62-218, Task 3511A,
Unclassified report

See also AD-632 279, -632 280.

Descriptors: (*Nuclear explosion damage, *Ecology), (*Nuclear warfare, Ecology), (*Nuclear weapons, Ecology), Radiation effects, Radiation injuries, Burns, Thermal radiation, Meteorological phenomena, Epidemiology, Insects, Micrometeorology, Fires, Erosion, Floods, Radioactive fallout, Radioactive isotopes, Strontium, Fission products, Lethal dosage, Disasters, Environment

Weapons effects capable of covering large areas are divided into four major categories, based on physical damage mechanisms. Radiological: damage to biological organisms caused by ionizing radiation. Thermal: damage caused by heat or fire. Meteorological: damage caused by changes in weather or climate, triggered by catalytic action of nuclear debris in the atmosphere. Secondary: damage caused by a 'domino' effect due to selective removal or modification of a constraint normally contributing to environmental homeostasis. Within this category we have included epidemiological problems affecting humans, livestock and crops; outbreaks of pests (especially insects); changes in ground surface temperature and humidity characteristics (microclimate); secondary fires; local ecological changes; erosion and floods; and 'the balance of nature.'

AD-632 521 See Fld. 19/3

AD-632 560 See Fld. 15/5

AD-632 595 See Fld. 6/21

15/7. OPERATIONS, STRATEGY, AND TACTICS

AD-632 017 See Fld. 5/2

AD-632 254 See Fld. 5/10

AD-632 572 See Fld. 1/3

Field 16-MISSILE TECHNOLOGY

16/2. MISSILE TRAJECTORIES

AD-632 533 Fld. 16/2, 20/13, 22/3
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF

INTERPRETATION OF RECOVERY-TEMPERATURE MEASUREMENTS AT LOW REYNOLDS NUMBERS,
by C. Forbes Dewey,Jr.. Apr 66, 13p. Rept. no. RM-4673-ARPA,
Contract SD-79,
Unclassified report

Descriptors: (*Atmosphere entry, *Thermodynamics), (*Reentry vehicles, Heat transfer), Reynolds number, Convection (Heat transfer), Recovery, Temperature, Measurement, Aerodynamic heating, Wake, Guided missiles

The memorandum demonstrates that the wire recovery temperature in a steady-state flow may be accurately determined without a detailed knowledge of the convective heat-transfer rate to the wire. The analysis is valid even for large conduction losses at the wire supports, and a similar analysis could be made for transient conditions. (Author)

AD-632 536 Fld. 16/2, 22/3, 20/4
CFSTI Prices: HC $3.00 MF $0.75
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
WIND TUNNEL INVESTIGATION OF THE TURBULENT NEAR WAKE OF A CONE AT ANGLE OF ATTACK.
Technical rept.,
by A. J. Schlesinger, and A. Martellucci. Mar 66, 61p. Rept. no. TR-581,
Contract SD-149,ARPA Order-396 Proj. 8030,
Unclassified report

Descriptors: (*Guided missiles, Atmosphere entry), (*Wake, Turbulence), (*Conical bodies, Aerodynamic characteristics), (*Reentry vehicles, Atmosphere entry), Angle of attack, Wind tunnel models, Stagnation point, Turbulent boundary layer

Aerodynamic measurements were made in the turbulent near wake of 10 deg. half angle circular cone at a 10 deg. angle of attack. The experiments were conducted at Mach 6 with a stagnation pressure of 800 psi and a corresponding free stream unit Reynolds number of 14.4 million per foot. The Reynolds number was sufficientl' large so that the boundary layer at the cone shoulder was turbulent. Detailed radial profiles of the total and static pressures along the meridian plane of symmetry in the supersonic regions of the wake at several axial stations are presented. In addition, the shape of the $u = 0$ line in the meridian plane of symmetry was also obtained. Correlations are shown for near-wake data obtained for zero angle of attack. (Author)

AD-632 347 **See Fld. 4/2**

AD-632 348 **See Fld. 4/2**

AD-632 349 **See Fld. 4/2**

AD-632 515 **See Fld. 4/2**

Field 17-NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17/1. ACOUSTIC DETECTION

AD-632 009 Fld. 17/1, 20/1
CFSTI Prices: HC $4.00 MF $0.75
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
A REVIEW OF FLOW NOISE RESEARCH RELATED TO THE SONAR SELF NOISE PROBLEM.
ASW sonar technology rept.,
by Patrick Leehey. Mar 66, 101p. Rept. no. 4110366,
Contract NObsr-93055, Proj. SF-101-03-21, Task 11353,
Unclassified report

Subcontracted by Bolt Beranek and Newman, Inc., Cambridge, Mass.

Descriptors: (*Sonar, Noise), (*Acoustics, Underwater), Sonar domes, Turbulent boundary layer, Underwater sound, Hydrodynamics, State-of-the-art reviews, Antisubmarine warfare

This report is a review of the literature concerning the excitation of structures by random pressure fluctuations in a turbulent boundary layer and the consequent acoustic radiation. Such radiation is termed flow noise. The purpose of the report is to determine those aspects of analysis and experiment on the subject that are pertinent to the generation of self noise in a sonar. The report is concerned with the physical mechanisms governing flow noise, with the prediction of the magnitude and distribution in frequency of flow noise, and with the discovery of measures that may be taken to reduce its influence upon sonar self noise. The outstanding research problems remaining in the field are pointed out, and recommendations are made for the direction of further research. (Author)

AD-632 082 **See Fld. 17/10**

AD-632 359 **See Fld. 20/1**

17/2. COMMUNICATIONS

AD-632 108 Fld. 17/2, 5/7
BUNKER-RAMO CORP CANOGA PARK CALIF
LINGUISTIC AND ENGINEERING ASPECTS OF AUTOMATIC SPEECH RECOGNITION.
Technical note,
by Paul L. Garvin, and Sidney Bertram. 1964, 4p. Rept. no. TN-5,
Contract AF 49 (638)-1128, Proj. AF-9769, AFOSR 66-0416
Unclassified report

Availability: Published in Phonetica v13 p37-9 1965. Copies to DDC users only.

Descriptors: (*Speech recognition, Automatic), Linguistics, Engineering, Electronics

This brief note comments on three problem areas associated with automatic speech recognition: (1) distortions occurring in the acoustic environment under ordinary circumstances; (2) dependence of recognition on context; and (3) selection of a form of analysis that yields parameters most nearly invariant to characteristics independent of message recognition. (Author)

AD-632 532 Fld. 17/2, 22/2, 5/3
CFSTI Prices: HC $2.60 MF $0.50
RAND CORP SANTA MONICA CALIF
THE ECONOMIC POTENTIAL OF COMMUNICATION SATELLITES,
by William Meckling. 1 Mar 61, 24p. Rept. no. P-2216 (rev.),
Unclassified report

Descriptors: (*Communication satellites (Active), Economics), (*Communication satellites (Passive), Economics), (*Radio communication systems, Satellites (Artificial)), Value engineering, Astronautics, Global communication systems, Radio relay systems, Radio waves, Ionospheric propagation

AD-632 082 **See Fld. 17/10**

AD-632 275 **See Fld. 20/14**

17/2.1 RADIO COMMUNICATIONS

AD-632 102 Fld. 17/2.1, 9/4, 20/14
CFSTI Prices: HC $4.00 MF $1.00
COOLEY ELECTRONICS LAB UNIV OF MICHIGAN ANN ARBOR
EXPERIMENTAL ERROR AND SIGNAL DATA FROM HIGH BIT RATE TACTICAL TROPOSCATTER DIGITAL COMMUNICATION LINK.
Final rept.,
by M. P. Ristenbatt, and E. P. Gould. Apr 66, 118p. Rept. no. TR-174,4951-5-F
Contract DA-36-039-sc-89168, Proj. DA-4951,
Unclassified report

Descriptors: (*Radio communication systems, *Digital systems), (*Information theory, Radio communication systems), (*Troposphere, Radio transmission), Medium frequency, Radio waves, Propagation, Data transmission systems, Errors, Probability, Signal-to-noise ratio, Superhigh frequency, Attenuation, Synchronization (Electronics), Numerical analysis, Computers

This report describes experimental error and signal data from a 100 mile troposcatter digital communication link at a bit rate of 576 kc. A repetitive one-zero pattern with binary FM was used at 4 kMc. Data were taken in each of the four seasons recording 10 to 15 six-minute tapes per season. The objective was a detailed computer analysis of error behavior, including analysis of instantaneous signal behavior so as to describe system conditions during errors. Five signals were sampled and multiplexed directly onto a digital tape: AGC, Combiner, Channel A, Channel B, and local Error Count. From the equipment point of view, increases in tolerable fade length do not appear profitable until one exceeds 30 to 50 milliseconds. Further increases sharply reduce the probability of encountering such fades. Finally, the results verified that there is little signal variation from season to season except varying median level. In general, the data analyzed here permit determining the requirements for synchronization circuits of the fading link. In addition, the data here serve as indicator of what can be expected with 100 mile troposcatter links at a bit rate of 576 kc. (Author)

AD-632 243 Fld. 17/2.1, 22/2, 9/3
CFSTI Prices: HC $6.00 MF $1.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SATELLITE RADIO COMMUNICATIONS,
by S. Dareckiego. 17 Feb 66, 261p. Rept. no. FTD-TT-65-109,
TT 66-61195
Unclassified report

Edited trans. of mono. Radiokomunikacia Satelitarna, Warsaw, 1964 159p.

Descriptors: (*Satellites (Artificial), Radio relay systems), (*Radio communication systems, Satellites (Artificial)), (*Communication satellites (Active), State-of-the-art reviews), (*Communication satellites (Passive), State-of-the-art reviews), Radio waves, Propagation, Global communication systems, Radio equipment, Television communication systems

This publication on telecommunications problems presents the problems of satellite radiocommunications as seen by Polish experts, working in areas which cover or concern problems of the same type, but which are differently applied. Problems connected with the rapid rise in the demand for intercontinental telecommunication channels are pre-

sented. It is proposed that the planned undersea cable lines will not be able to ensure a sufficient number of channels thus making it necessary to look for other solutions to this problem. A general view of the proposed and planned means of achieving a technical solution for satellite links is presented. The problem of radiowave propagation is discussed in connection with the construction of satellite and ground station antennas. Selected problems on microwave transmission and reception engineering are presented. A review is made of the most important problems connected with the launching of satellites into orbit and with the stabilization of their motion. Finally, future experiments on communication facilities for Poland are described.

AD-632 378 Fld. 17/2.1
CFSTI Prices: HC $3.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
ON THE NATURE AND OPTIMIZATION OF THE GROUND (LATERAL) WAVE EXCITED BY SUBMERGED ANTENNAS.
Research rept.,
by D. Staiman, and T. Tamir. Jan 66, 53p. Rept. no. PIBMRI-1292-65,
Contract AF 49 (638)-1402,
Unclassified report

Descriptors: (*Radio waves, Optimization), Dipole antennas, Electromagnetic waves, Dielectrics, Air, Reflection, Soils, Sea water, Theory, Optical properties

The radiation of a dipole immersed in a conducting dielectric half-space bounded by air is examined by employing a representation which resolves the field into a space wave, a lateral wave and lower order diffraction terms. At points away from the interface between the two media, the far field is given primarily by the space wave which appears as a geometric optical ray contribution. However, at points close to the air-dielectric boundary, the field (known then as a 'ground wave') is dominated by the lateral wave whose quasi-optical properties are discussed in detail. It is shown that the ground wave may be enhanced by orienting the dipole in a direction which optimizes the excitation of the lateral wave. The optimum condition is obtained as a function of the properties of the lossy medium and it is shown that, for small conductive losses, the ground wave is strongest when the free-space radiation of the dipole is directed at an angle close to the critical angle of reflection in geometrical optics. For large losses, the optimum orientation is realized when the dipole is nearly parallel to the interface, in agreement with previous results. Quantitative results are presented for the fields produced under these optimum conditions; calculations are given over wide frequency ranges with specific results for representative cases of grounds consisting of dry earth, moist earth or sea water. (Author)

AD-632 012 See Fld. 9/5

17/7. NAVIGATION AND GUIDANCE

AD-632 308 Fld. 17/7, 1/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE DYNAMICS OF AN AUTOMATIC COURSE SYSTEM,
by L. A. Komraz. 29 Apr 66, 16p. Rept. no. FTD-TT-65-1784,
TT 66-61203
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie. n5 p54-60 1964.

Descriptors: (*Dynamics, *Course indicators), Automatic, Flight control systems, USSR

The dynamics of an automatic course with consideration of limiting the turn of the rudder is discussed. The dynamic system of the third order with two nonlinearities are investigated by the method of point transformations. (Author)

AD-632 450 Fld. 17/7, 20/11
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS
UBER DIE ROTATIONSENERGIEN UND EIGENFUNKTIONEN DES SYMMETRISCHEN UND ASYMMETRISCHEN KREISELS (ON THE ROTARY ENERGIES AND CHARACTERISTIC FUNCTIONS OF THE SYMMETRIC AND ASYMMETRIC GYROSCOPE),
by Egil A. Hylleraas. 18 Sep 65, 11p. Rept. no. 31,
Contract AF-EOAR-32-64,
AFOSR 66-0700
Unclassified report

Text in German.

Availability: Published in Zeitschrift fur Physik v190 p226-34 1966. Copies to DDC users only.

Descriptors: (*Gyroscopes, Mechanics), Rotation, Energy, Functions

AD-631 849 See Fld. 22/3

AD-632 496 See Fld. 8/5

AD-632 585 See Fld. 13/9

17/8. OPTICAL DETECTION

AD-632 237 Fld. 17/8, 22/2, 13/1
CFSTI Prices: HC $3.00 MF $0.75
EDGERTON GERMESHAUSEN AND GRIER INC BOSTON MASS
SATELLITE STROBE LIGHT EVALUATION.
Final rept.,
by F. S. Gronberg, and A. L. Rotch. 7 Aug 63, 91p. Rept. no. EGG-B-2632,
Contract AF 19 (628)-495, Proj. AF-7600, Task 760003,
AFCRL 63-950
Unclassified report

Document includes Flashing Light Satellite System for Snap Radiation Environments, by J. R. Burnett, Z. Azary, and C. W. Sandifer, Report no. S-227-R.

Descriptors: (*Stroboscopes, *Satellites (Artificial)), (*Satellite tracking systems, Beacon lights), Spacecraft, Nuclear power plants, Auxiliary power plants, Radiation damage, Lighting equipment, Flash lamps, Optical tracking, Astronomical geodesics

The Satellite Optical Beacon, LS-21 was designed as a satellite borne tracking aid and calibrated light source. Flashing in the ANNA 1-B satellite (launched 10/31/62), it has been observed with binoculars at slant ranges in excess of 700 miles, and photoelectrically and photographically at slant ranges in excess of 1200 nautical miles. Also, a study of design modifications was performed on the Flashing Light Satellite System for reliable operation in a Space Nuclear Auxiliary Power (SNAP) nuclear radiation environment.

AD-632 309 Fld. 17/8, 9/5
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PHOTOELECTRIC TRACKING DEVICE,
by G. P. Katys, and Yu. V. Strelnikov. 29 Apr 66, 7p. Rept. no. FTD-HT-66-81,
TT 66-61204
Unclassified report

Unedited rough draft trans. of Patent (USSR) 160 777, appl. 818157/26-30, 26 Feb 64.

Descriptors: (*Optical tracking, *Image tubes), Photoelectric effect, Phase (Electronics), Cathodes (Electron tube), Patents, Photomultipliers, Image

The purpose of the invention is a photoelectric tracking device which utilizes a dissector as the sensitive element. At the photocathode of the dissector a point image of the tracking object is projected and a signal from its output is compared in phase with a reference signal. A circular diaphragm is mounted before the anode of the dissector concentric with the axis of the optical system and dissector, and two pairs of deflection coils in the transfer section of the dissector are connected to a stabilized ac source which provides restrictively to each pair of coils sinusoidal voltages of the same frequency and displaced in phase from one another by 90 degrees.

AD-632 131 See Fld. 3/2

17/9. RADAR DETECTION

AD-632 132 Fld. 17/9
CFSTI Prices: HC $1.60 MF $0.50
MICHIGAN STATE UNIV EAST LANSING DIV OF ENGINEERING RESEARCH
MINIMIZATION OF RADAR CROSS SECTIONS OF CYLINDERS BY COMPENSATION METHOD,
by Kun-Mu Chen. 25 Feb 66, 20p. Rept. no. Scientific-1,
Contract AF 19 (628)-5732, Proj. AF-8683, Task 868302,
AFCRL 66-207
Unclassified report

Descriptors: (*Radar echo areas, Optimization), Cylindrical bodies, Feasibility studies, Backscattering, Electrical impedance

The feasibility of minimizing the back scattering of a conducting cylinder by attaching a parallel thin, loaded wire is investigated. When the cylinder and wire are illuminated by an electromagnetic wave, currents are induced on them. If the induced current on the wire is modified by a proper impedance loading, it may cancel the effect of the induced current on the cylinder in such a way that the total back-scattered field produced by the cylinder and the wire is minimized. In the analysis, a solid cylinder and a thin, center-loaded wire are placed parallel to one another and a plane wave is assumed to be incident on them at an angle. The induced currents on them and the scattered field from them are calculated, and the optimum impedance to be loaded at the wire to achieve zero total back scattering is obtained. This method should have direct application to radar camouflage for space vehicles. (Author)

AD-632 218 Fld. 17/9, 22/3
CFSTI Prices: HC $3.00 MF $0.75
SICHAK ASSOCIATES PARAMUS N J
COHERENT FOCUSING RADAR (COFFER).
Final technical rept.
Apr 66, 63p. Contract AF 30 (602)-3492, Proj. AF-4506, Task 450604,
RADC TR-65-517
Unclassified report

Descriptors: (*Coherent radar, *Satellite tracking systems), (*Radar tracking, Coherent radar), Radar equipment, Radar targets, Satellites (Artificial), Tracking, Target acquisition, Focusing, Performance (Engineering)

An ECHO II tracking experiment was attempted using the coherent focusing radar (COFFER) system developed under Contract AF30 (602)-2750. The objective was to investigate acquisition time, coherency of focus and tracking capability of the equipment when used with a satellite target. The COFFER equipment was previously optimized for aircraft targets and depended on externally supplied look angles from another radar for target

220-596 O-66-4

acquisition. For use with ECHO II, the system was modified somewhat and an optical tracking subsystem was added for aid in acquisition. However this method of acquisition was effective only during visual passes of the satellite in good weather which did not prevail during the time available. Only limited results were obtained for this reason. (Author)

AD-632 339 Fld. 17/9, 9/2
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
HAYSTACK POINTING SYSTEM: PRINT PROGRAM.
Technical note,
by J. D. Drinan. 9 Mar 66, 99p. Rept. no. TN-1966-11,
Contract AF 19(628)-5167, Proj. AF-649L,
Unclassified report

See also AD-622 784, -629 936, -631 106.

Descriptors: (*Radar antennas, Steering), (*Radio telescopes, Steering), (*Space surveillance systems, *Programming (Computers)), Printing, Magnetic tape, Satellite tracking systems, Radio astronomy, Tracking, Massachusetts

During the operation of the Haystack Pointing System, variable amounts of system generated data are recorded on magnetic tape for purposes of later reconstruction of the pointing aspect of the experiment. The Print Program, a pseudocelestial computation program, is the means whereby this system data, recorded during actual system operation or during a system planning run, is reconstituted in the form of print-outs for immediate inspection or as BCD magnetic tape equivalents of the print-outs for remote printing and for input to other programs. The Print Program provides a variety of operation options which can be altered dynamically. (Author)

AD-632 344 Fld. 17/9, 9/1, 20/9
CFSTI Prices: HC $6.00 MF $1.25
ELCON LAB INC PEABODY MASS
HIGH POWER MAGNETICALLY CONFINED PLASMA DUPLEXER.
Rept. no. 9 (Final), 31 May 63-31 Aug 65,
by Edwin Langberg, and William R. Ghen. 31 Aug 65, 238p. Rept. no. R-3-66-1,
Contract DA-36-039-AMC-02364 (E), Proj. DA-7900-21-223-01-00,
ECOM 02364-F
Unclassified report

See also AD-621 745.

Descriptors: (*Radar duplexers, Plasma medium), (*Plasma medium, Containment), Magnetic fields, Microwave equipment, Time, Recovery, Magnets, Chlorine, Quartz, Fibers, Cavity resonators, Diffusion

The theory of confining a microwave gas plasma discharge by means of a magnetic field is presented. Two types of magnetic fields, cusp shaped and mirror are analyzed. Both type fields are investigated experimentally using suitable microwave cavity structures and plasma containers. The high power experimental microwave equipment uses a traveling wave resonant ring simulator to ionize the plasma at pulsed powers up to 70 megawatts peak, 70 kilowatts average. The major technical problem associated with the use of a stable confinement system is the inherently long recovery time. The use of both chlorine as an attaching gas and a quartz wool filled plasma container reduces recovery time to practical ranges, but conflicts somewhat with the fundamental principles of confinement. The use of a quartz wool filled plasma container with cusp magnetic field seems to provide the best compromise between magnetic confinement principles and microwave performance. (Author)

AD-632 489 Fld. 17/9, 9/2
CFSTI Prices: HC $3.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
HAYSTACK POINTING SYSTEM: SATELLITE ACQUISITION.
Technical note,
by R. Teoste. 30 Mar 66, 58p. Rept. no. TN-1966-8,
Contract AF 19(628)-5167 Proj. AF-649L,
ESD TDR-66-158
Unclassified report

Descriptors: (*Radar antennas, Steering), (*Satellite tracking systems, Radar antennas), (*Target acquisition, Satellite tracking systems), (*Radar tracking, Satellite tracking systems), X band, Parabolic antennas, Focusing, Programming (Computers), Flow charting, Automatic, Tracking, Radio telescopes

Haystack Pointing System consists of hardware and software which points the Haystack 120-foot X-band antenna dish with great accuracies. The Satellite Acquisition program, described in this report, generates acquisition scans and searches for target returns. Once the target has been sighted, the program tracks the target by conical scanning. After acquisition, time correction can be made in the orbit computations. (Author)

AD-631 963 **See Fld. 4/2**

AD-631 964 **See Fld. 4/2**

AD-631 966 **See Fld. 4/2**

AD-631 967 **See Fld. 4/2**

AD-631 968 **See Fld. 4/2**

AD-632 335 **See Fld. 9/1**

AD-632 572 **See Fld. 1/3**

17/10. SEISMIC DETECTION

AD-632 082 Fld. 17/10, 17/1, 17/2, 9/4
CFSTI Prices: HC $3.00 MF $0.75
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
ACTIVE SEISMIC SYSTEMS FOR COMMUNICATIONS AND SURVEILLANCE.
Technical rept.,
by Kurt Ikrath, Wilhelm A. Schneider, and Ronald F. Johnson. Apr 66, 99p. Rept. no. ECOM-2695,
Proj. DA-IPO-14501-B31A
Unclassified report

Descriptors: (*Seismic waves, *Communication systems), (*Transducers, Seismic waves), (*Information theory, Seismic waves), Extremely low frequency, Signal generators, Mechanical waves, Propagation, Soils, Ice, Glaciers, Active, Acoustics, Acoustic detectors

Experimental and theoretical data are presented on the generation of seismic signals and the efficiency of signal insertion into soil and ice employing 80 cps, 10-Watt max resonant portable seismic transducers. The influence of the mechanical bulk properties and of the structural dimensions of seismic media on the transducer performance and on the preservation of seismic signal integrity is analyzed in connection with seismic communications via the weathered zone of the earth. (Author)

AD-631 847 **See Fld. 8/11**

AD-632 146 **See Fld. 8/11**

AD-632 147 **See Fld. 8/11**

AD-632 150 **See Fld. 8/11**

AD-632 453 **See Fld. 8/11**

Field 18-NUCLEAR SCIENCE AND TECHNOLOGY

18/2. ISOTOPES

AD-632 528 **See Fld. 7/5**

18/3. NUCLEAR EXPLOSIONS

AD-632 106 **See Fld. 8/13**

AD-632 279 **See Fld. 15/6**

AD-632 280 **See Fld. 15/6**

AD-632 281 **See Fld. 15/6**

18/4. NUCLEAR INSTRUMENTATION

AD-631 930 Fld. 18/4
CFSTI Prices: HC $2.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL
DESIGN, CONSTRUCTION AND OPERATION OF THE 50 CENTIMETER LIQUID HELIUM BUBBLE CHAMBER.
Interim technical rept., 1965-1966,
by Martin M. Block, and Ronald J. Walker. 28 Apr 66, 41p. Rept. no. TR-1-66,
Contract Nonr-1228(21), Proj. NR-022-382,
Unclassified report

Descriptors: (*Bubble chambers, Helium), Liquefied gases, Design, Construction, Cryogenics, Low-temperature research, Nuclear particles, Nuclear scattering, Cryostats, Photographic techniques

The chamber, whose dimensions are 50 x 25 x 30 cu cm, is operated in the magnetic field whose maximum value is approximately 28 kilogauss. The photography is of the dark-field type using straight-thru illumination from a diffusing screen with dark patches. A pair of condensers, located close to the chamber, form images of the dark patches about the 3 camera lenses, which view the chamber with 16 degree stereo. New cameras have been installed which use 35 mm sprocketed film, and these cameras can advance in 0.1 seconds. The chamber has completed a successful run producing 400,000 triads in a 150 MeV/c pion beam at the University of Chicago synchrocyclotron. It requires a crew of three and can be lifted into the beam in an operational condition. The static loss rates from the liquid helium reservoir are around 2 liters/hour and the dynamic loss is about 1 liter per 400 expansions. (Author)

AD-632 284 Fld. 18/4, 8/10, 18/8
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
EFFICIENT DETECTION OF LOW LEVELS OF RADIOACTIVITY IN SEAWATER,
by Authur H. Redmond. 20 May 66, 26p. Rept. no. USNRDL-TR-1000,
Proj. SR-104-03-01, Task 0584,
Unclassified report

Descriptors: (*Sea water, *Radioactivity), (*Gamma-ray spectroscopy, Sea water), (*Oceanographic equipment, Gamma-ray spectroscopy), Crystal counters, Gamma counters, Nuclear radiation spectrometers

The problem of assaying radioactivity in the sea has been under study with a view to designing an optimum detector for gamma radiation spectra with suitable statistical accuracy. The responses of a series of crystal detector spheres of radii from 0.1 cm to 15 cm, having unit intrinsic efficiency to gamma rays has been calculated for unit gamma emitter per unit volume. The principal result brought out is the large increase in counting rate

as the solid angle of acceptance of the spheres for gamma radiation increases. With larger spheres the sample volume increases but gives a negligible increase in counting rate. Graphs are given for the series of spheres for energies between 0.137 Mev and 3.6 Mev. A formula is given for the maximum counting rate for any size sphere under bombardment with any gamma ray energy. It can be used to estimate the size detector needed to count an emitter with required statistical accuracy, making allowance for intrinsic efficiency of the detector to gamma rays of a particular energy, and for any concentration of emitter. A procedure is outlined for selecting the particular isotope which has been activated by unit neutron fluence to obtain the maximum counting information in the shortest time. Differential counting of two isotopes over two different periods of time should give information on recency of activation. (Author)

AD-632 527 Fld. 18/4, 20/12
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
DEPENDENCE OF PULSE AMPLITUDE AND POLARITY ON POSITION OF ENTRY IN A SOLID-STATE PARTICLE DETECTOR.
Technical rept.,
by Michael Basso. Mar 66, 21p. Rept. no. ECOM-2680,
Proj. DA-1P0-14501-B11A, Task 1P0-14501-B11A-01,
Unclassified report

Descriptors: (*Radiation measurement systems, *Semiconductors), Solid state physics, Silicon, Charged particles, Space charges, Polarization, Carriers (Semiconductors), Alpha particles, Radiation chemistry

The dependence of pulse height and polarity on the point of entry by an incident energetic particle on a P-N type silicon solid-state radiation detector was investigated. It is shown that the application of an external bias across the base material (P type) alters the charge carrier collection characteristics of the solid-state radiation detector sufficiently to produce these observed changes in the recorded signal. This effect is attributed to the difference in mobilities between holes and electrons generated by the incident energetic particle and the influence of injected carriers on the space charge region. It is also shown that the collection time of charge carriers within the space charge region is not dependent on position of entry by the incident particle while the collection time of charge carriers outside the space charge region is position dependent. (Author)

18/7. RADIOACTIVE WASTES AND FISSION PRODUCTS

AD-632 242 See Fld. 18/8

AD-632 356 See Fld. 18/8

18/8. RADIOACTIVITY

AD-631 954 Fld. 18/8, 20/8
CFSTI Prices: HC $5.00 MF $1.00
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
TABLES OF COEFFICIENTS FOR ANGULAR CORRELATION OF RADIATIVE TRANSITIONS FROM ALIGNED NUCLEI.
Technical rept.,
by D. D. Watson, and Gale I. Harris. Feb 66, 175p. Rept. no. ARL-66-0030,
Proj. AF-7112,
Unclassified report

Descriptors: (*Nuclear energy levels, Transformations), (*Nuclear spectroscopy, Tables), Nuclear structure, Nuclear reactions, Gamma ray emission, Quantum statistics, Tensor analysis, Nuclear spins

The report contains a list of basic formulas and tabulations of numerical coefficients which are useful for the analysis of data on intensity-direction correlations of successive radiative transitions from aligned nuclei. The formulas are extracted from an earlier published development of the angular correlation formalism. This development is based upon a factored version of the equations which is used to extend the application from the usual two-step cascade to general multiple-step cascades. The resulting flexibility and greater efficiency of the formalism is utilized in this report to provide an extensive tabulation of coefficients for a variety of specific applications. Coefficients are provided for analysis in terms of either the population parameters or the statistical tensors of the aligned state. The coefficients can be used for the analysis of angular distributions, triple correlations, and triple correlations involving one or more intermediate unobserved radiations. In contrast with previous tabulations of coefficients for angular-correlation analysis, the range of the present tables has been extended to include multipolarities through octupole. The overall length of the tables, however, remains about the same as previous tables because of the greater efficiency of the factored formalism. The range of spins covered by the tables are $J < or = 1\ 1/2$ for the initial aligned state and $J < or = 2\ 1/2$ for the final state of a cascade. (Author)

AD-632 112 Fld. 18/8, 9/1, 7/5
CFSTI Prices: HC $6.60 MF $0.75
HUGHES AIRCRAFT CO FULLERTON CALIF
SURFACE EFFECTS OF RADIATION OF MICROELECTRONIC DEVICES.
Final rept., 12 Apr-2 Nov 65, Pt-1,
by Daniel Binder, Barbara M. Kuehne, Ronald I. Wilbur, and Daryl T. Butcher. 2 Nov 65, 70p. Rept. no. FR-65-10-243,
Contract N228 (62479)68466, Proj. SR-007-11-01, Task 0551,
USNRDL TRC-19
Unclassified report

Descriptors: (*Radiation damage, Electronic equipment), (*Transistors, Radiation damage), (*Integrated circuits, Radiation damage), (*Microminiaturization (Electronics), Radiation damage), Surface properties, Films, Electron bombardment, Gamma rays, Radiation chemistry

The objectives were to study: (1) The radiation susceptibility of planar transistors (separately and in integrated circuits) and insulated gate thin film transistors (IGTFT) irradiated with Co60 gamma radiation and Linac electron radiation; (2) the relation between the radiation response and physical characteristics; (3) the radiation susceptibility in general for planar and IGTFT devices; and (4) the degree to which Co60 radiation can be used to investigate surface radiation effects from a weapon's burst. (Author)

AD-632 242 Fld. 18/8, 20/8, 18/7
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
CALCULATIONS OF THE ENERGY AND MASS YIELDS FROM THERMAL-NEUTRON FISSION OF U235,
by James M. Ferguson, and Philip A. Read. 12 May 66, 42p. Rept. no. USNRDL-TR-992,
Proj. SR-011-01-01, Task 0401,
Unclassified report

Descriptors: (*Uranium, Fission), (*Fission products, Numerical analysis), Energy, Neutron reactions, Nuclear models

Improvements in a semi-empirical correlation of the energy and mass yield data for U236 fission are presented. The available mass, energy, and neutron emission data are correlated with each other within the accuracy of the input data. A simple model of the U236 fragments at scission is presented. This model, together with some experimental data, is used to predict the surface tension parameters of the fragments and kinetic energies of the fragment pairs. The calculated kinetic energies agree reasonably well with experiment. The surface tension parameters of the fragments show strong shell effects, as indicated in other studies. The shapes of the fragments at scission are estimated from the model. (Author)

AD-632 356 Fld. 18/8, 7/5, 18/7
CFSTI Prices: HC $2.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
RADIOCHEMICAL DATA CORRELATIONS FOR SEAWATER AND CORAL-SURFACE BURSTS,
by Glenn R. Crocker. 22 Jan 66, 28p. Rept. no. USNRDL-TR-991,
Contract AT (49-7)-1963,
Unclassified report

See also AD-626 608.

Descriptors: (*Radioactive fallout, Surface burst), (*Distillation, Fission products), Graphics, Correlation techniques, Radiochemistry, Distillation, Sea water, Coral reefs

Radiochemical data on fallout samples from three high-yield surface bursts have been correlated by a method of log-log plotting. The correlations were comparable with those available for similar burst conditions. (Freiling, E. C., 'Radionuclide fractionation in bomb debris,' Science, 133:991 (1961)). The results presented in this report confirm the utility of the method and indicate the strong effects of fractionation on the radiochemical composition of fallout from surface bursts. (Author)

AD-632 152 See Fld. 9/1

AD-632 279 See Fld. 15/6

AD-632 280 See Fld. 15/6

AD-632 281 See Fld. 15/6

AD-632 284 See Fld. 18/4

AD-632 458 See Fld. 20/12

AD-632 466 See Fld. 20/12

AD-632 467 See Fld. 20/12

AD-632 539 See Fld. 20/12

18/10. REACTOR MATERIALS

AD-632 323 See Fld. 20/4

18/11. REACTOR PHYSICS

AD-632 534 Fld. 18/11, 20/8
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
A PRELIMINARY INVESTIGATION OF TRANSPORT-BRANCHING PROCESSES,
by Bernard Shiffman. Mar 66, 34p. Rept. no. RM-4290-ARPA,
Contract SD-79,ARPA Order-189-61
Unclassified report

Descriptors: (*Neutron transport theory, *Stochastic processes), Probability, Equations, Invariance, Multiplication factor

A probabilistic discussion of one-dimensional multitype neutron transport processes is given, and the invariant imbedding technique is applied to the generating functions of the emitted neutrons. A system of simultaneous partial differential equations for these generating functions is then derived. The well-known Ricatti equation for the expected reflected flux follows from these differential equations. (Author)

Field 19-ORDNANCE

19/1. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-632 111 Fld. 19/1, 13/12
CFSTI Prices: HC $1.60 MF $0.50
NAVAL WEAPONS LAB DAHLGREN VA
A METHOD FOR PROTECTING ELFCTROEXPLOSIVE DEVICES FROM SPURIOUS ELECTRICAL INITIATION.
Technical memo.,
by R. R. Potter. Feb 60, 19p. Rept. no. TM-W-3/60,

Unclassified report

Descriptors: (*Explosives initiators, *Electromagnetic shielding), Safety, Ordnance, Electric detonators, Electric igniters, Safety devices, Arming devices, Suppressors, Electric currents, Signals

It is proposed to protect the EED from initiation from spurious signals by completely inclosing it in a metallic shield. To arm the device, a large dc current melts away the part of the shield that surrounds the firing leads to the EED. The novel feature is the use of a small silicon diode in series with the firing lead inside the shield to block the dc arming current from initiating the EED. An alternating current or a direct current of opposite polarity can then be used to fire the EED in the usual way at a later time. The advantage of separating the arming and firing functions is that the arming current may be made much larger than any available spurious signal. The firing sensitivity of the EED may be any value required by other design considerations such as limited available firing current. If the diode is not used, the fusible shunt merely lowers the EED sensitivity; and firing occurs at arming. (Author)

AD-632 153 Fld. 19/1, 19/8
CFSTI Prices: HC $3.60 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
SPINNING UNDERWATER PROJECTILES,
by A. Miller. 7 Mar 51. 35p. Rept. no. NAVORD-1652.

Unclassified report

Descriptors: (*Underwater projectiles, Spin), Spin-stabilized ammunition

Cavity motion of blunt nosed underwater spinning projectiles js considered for that portion of the trajectory during which only the nose of the projectile is in contact with the water. It can be concluded that flat nosed spinning projectiles can be designed that will be more stable during underwater travel in a cavity than similar non-spinning projectiles. (Author)

AD-632 154 Fld. 19/1, 19/4
CFSTI Prices: HC $2.60 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
THE EFFECT OF SLOW SPIN ON THE UNDERWATER TRAJECTORY OF A MISSILE SINKING AT TERMINAL SPEED,
by A. Miller. 25 Nov 52. 29p. Rept. no. NAVORD-3150.

Unclassified report

Descriptors: (*Underwater trajectories, *Guided missile trajectories), Spin, Spin - stabilized ammunition

The motion of a stable, slowly spinning underwater missile sinking at terminal speed is examined. It is assumed that some parts of the missile are out of alignment due to imperfect manufacture or damage at water entry. It is shown that the trajectory is a circular helix with its axis vertical. The diameter of this helix is determined by the characteristics of the missile and the degree of misalignment present, and is a rapidly decreasing function of the spin. (Author)

AD-632 564 See Fld. 20/2

19/3. COMBAT VEHICLES

AD-632 521 Fld. 19/3, 13/6, 15/6
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
AMPHIBIOUS VEHICLE. NUCLEAR WEAPONS AND THE TANK,
by A. Dozorov, and A. Kuptil. 1966, 4p. Rept. no. I-2451,
TT 66-61236

Unclassified report

Mashina-Plavayushchaya. Yadernoe Oruzhie i Tank, trans. of Starshina-Serzhant (USSR) n2 p17 and 32 Feb 1963.

Descriptors: (*Amphibious vehicles, Operation), (*Tanks (Combat vehicles), Nuclear weapons), Cold weather tests, Engines + motors, Nuclear warfare, Army personnel, Nuclear explosion damage, Nuclear particles, Blast, Radioactive fallout, Contamination, USSR

AMPHIBIOUS VEHICLE, by A. Dozorov. Comments are made on operation in cold weather. The chain drive sprocket wheel should not be turned without first checking the spark. Warming the engine at temperatures below zero should be achieved by warming 2 or 3 times, bringing the temperature of the oil up to 90C, waiting 5 to 7 minutes, and then depressing the pump button. When afloat in cold water, the engine speed should be kept between 1000 and 1200 rpm, and the butterly valve should be closed. NUCLEAR WEAPONS AND TANKS, by A. Kuptil. The destructive factors of nuclear weapons are given as blast, flash, penetrating radiation, and radioactive contamination. Troops in tanks are said to have an undisputed advantage over other ground force personnel.

19/4. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-632 228 Fld. 19/4, 20/9
COLUMBIA UNIV NEW YORK
NORMAL IONIZING SHOCK WAVES,
by Robert T. Taussig. 18 May 65, 14p. Contract AF 49 (638)-1254, Proj. AF-9752, Task 975201, AFOSR 66-0359

Unclassified report

See also AD-619 206

Availability: Published in The Physics of Fluids v8 n9 p1616-27 Sep 1965. Copies to DDC users only.

Descriptors: (*Shockwaves, *Ionization), Magnetrohydrodynamics, Entropy, Continuum mechanics, Electromagnetic fields, Boundary value problems, Shock tubes, Detonation waves

Solutions to the steady-state jump equations are obtained for a normal ionizing shock wave propagating into a nonconducting, quiescent gas in an electromagnetic field. Comparison of these solutions to pure magnetohydrodynamic shocks and ordinary gas shocks indicates that ionizing shocks are hybrids having some properties common to both magnetohydrodynamic and gas shocks. Some completely novel effects are produced by the upstream electromagnetic field. The shock velocities are bounded for a given upstream electric field strength where the electric field is assumed parallel to the shock plane. For electric fields larger than a critical value, no steady compressive shocks exist, and for nonzero electric fields 'switch-on' behavior is extended to slow shocks. Solutions analogous to detonation-deflagration waves have been found, and the Chapman-Jouguet condition is applied to them. The complete boundary value problem is solved in the context of an electromagnetic annular shock tube to place the analytic results in the framework of experimentally observable phenomena. (Author)

AD-632 384 Fld. 19/4, 20/4
MICHIGAN UNIV ANN ARBOR
A HYDRODYNAMIC THEORY FOR THE PROPAGATION OF GASEOUS DETONATIONS THROUGH CHARGES OF FINITE WIDTH.
Revised ed.,
by Martin Sichel. 15 Nov 65, 9p. Contract DA-ARO (D)-31-124-G345,
AROD 3559:4

Unclassified report

Revision of manuscript submitted 6 Jan 65. Presented at AIAA Aerospace Sciences Meeting (2nd), as preprint 65-39, New York, 25-27 Jan 65.

Availability: Published in AIAA Journal v4 n2 p264-72 Feb 1966. Copies to DDC users only.

Descriptors: (*Detonations, Propagation), Velocity, Fluid dynamic properties, Shock waves, Differential equations, Gas flow

Detonations through an explosive of finite width are curved and propagate at a lower velocity than an ideal one-dimensional plane wave. A theory relating the velocity decrement and curvature of a gaseous detonation to the conditions at the explosive inert interface is developed. A two-dimensional detonation bounded on one side by a solid wall and on the other by an inert gas is considered. Approximate reaction zone equations are developed by perturbing with respect to the plane wave solution. Locally the reaction zone equations are the same as for one-dimensional flow with increasing area and heat addition, the rate of increase depending on the local wave curvature and the density variation through a plane detonation. Using Fay's result that the relative detonation velocity decrease is proportional to the fractional increase in the reaction zone streamtube area, an ordinary differential equation for variation of the wave angle is developed. Approximate solutions of the foregoing equation yielded velocity decrements that agreed with experimental results. (Author)

AD-632 154 See Fld. 19/1

AD-632 347 See Fld. 4/2

AD-632 348 See Fld. 4/2

AD-632 349 See Fld. 4/2

AD-632 353 See Fld. 8/5

AD-632 484 See Fld. 7/5

AD-632 515 See Fld. 4/2

AD-632 529 See Fld. 20/1

AD-632 575 See Fld. 21/2

19/8. UNDERWATER ORDNANCE

AD-632 077 See Fld. 20/4

AD-632 153 See Fld. 19/1

Field 20-PHYSICS

20/1. ACOUSTICS

AD-631 945 Fld. 20/1, 20/4
CFSTI Prices: HC $1.00 MF $0.50
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING

WEAKLY-RADIATIVE ACOUSTIC FLOW INDUCED BY RADIATION FROM A STATIONARY WALL,
by Alexander Solan, and Ira M. Cohen. Mar 66, 22p. Rept. no. 12,
Contract Nonr-562 (35), Proj. NR-061-132,
Unclassified report

Descriptors: (*Acoustics, *Gas flow), Boundary layer, Thermal conductivity, Sound transmission, Mathematical analysis

The radiative wave flow induced by radiation from a stationary solid wall is treated for large ratio of photon mean free path to molecular mean free path, and large Boltzmann number. The time scale considered is of the order of the photon m.f.p. divided by the speed of sound. Under these conditions the problem is split into a radiationless, heat-conducting boundary layer and a radiation-induced acoustic outer region. These are reduced to the form of a heat-conduction equation and an inhomogeneous linear wave equation, respectively, and solved in closed form. The radiation-induced acoustic flow is characterized by a weak discontinuity (in the second derivatives of the flow variables) propagating at the isentropic speed of sound. The result is a simple analytic representation of the long-range character of radiation-induced flow and will be useful as a reference solution for comparison with more complex problems.

AD-632 075 Fld. 20/1
CFSTI Prices: HC $1.00 MF $0.50
NAVY UNDERWATER SOUND REFERENCE LAB ORLANDO FLA
ANALYSIS OF ACOUSTIC IMPEDANCE DATA.
Research rept.,
by Gerald A. Sabin. 5 May 66, 17p. Rept. no. USRL-RR-81,
Unclassified report

Descriptors: (*Acoustic impedance, *Underwater sound), Sound, Propagation, Materials, Acoustic properties, Measurement, Transmission lines, Transducers, Numerical methods and procedures

Procedures and applicable charts for the analysis of acoustic impedance data obtained from the USRL pulse tube are presented. Formulas and tables for rapid determination of the bilinear transformation (1 + r)/ (1 - r) are shown. (Author)

AD-632 099 Fld. 20/1, 8/10
CFSTI Prices: HC $2.00 MF $0.50
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
PRECISION SOUND VELOCITY PROFILES IN THE OCEAN. VOLUME I. THE SOUND CHANNEL IN THE BERMUDA-BARBADOS REGION. NOVEMBER-DECEMBER 1963.
Final technical rept. Nov-Dec 63,
by Ants T. Piip. Jan 66, 44p. Rept. no. TR-3, CU-3-66
Unclassified report

Descriptors: (*Underwater sound, *Sound transmission), (*Acoustics, Underwater sound), Atlantic Ocean, Bermuda, Sound ranging, Velocity, Depth finding, Data processing systems, Mapping

A collection of high-precision detailed consecutive sound velocity - depth profiles of the sound channel in the ocean is presented from 17 Stations in the Bermuda - Barbados area for November and December 1963. The data is displayed both in the form of families of individual profiles, with time information; and as composite envelopes for each station, emphasizing the total spread at each site. A short description of the most salient features is given. (Author)

AD-632 359 Fld. 20/1, 17/1
CFSTI Prices: HC $3.60 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
GAIN OF A THREE-DIMENSIONAL ARRAY IN A DIRECTIONAL NOISE FIELD.
Research rept.,
by Benjamin J. Cron, and Clair J. Becker. 13 Apr 66, 40p. Rept. no. USL-710,
Proj. SF-101-03-15, Task 11285,
Unclassified report

Descriptors: (*Hydrophones, Gain), (*Sound signals, Analysis), Linear systems, Underwater sound, Noise, Correlation techniques, Graphics

The array gain of a three-dimensional 32-element array is obtained for the case of directional noise. For a perfectly coherent signal, the array is given in terms of the spatial correlation of noise. A brief review of the spatial correlation equation corresponding to directional noise is given. Experimental verification of this model is cited. The array gains are compared for the isotropic and directional noise cases for plus or minus 13 degree steering from the horizontal direction. The plus or minus degree beam for the isotropic noise case is close to the + 13 degree beam of the directional noise case but is very different from the -13 degree beam of the directional noise case, the maximum difference being about 10 db. The maximum gain for the latter case is 27 db. (Author)

AD-632 471 Fld. 20/1
RENSSELAER POLYTECHNIC INST TROY N Y
NOISE COVARIANCE AND VERTICAL DIRECTIVITY IN A DEEP OCEAN,
by W. S. Liggett Jr., and M. J. Jacobson. 1965, 10p. Rept. no. RPI-Math-Rep-71,
Contract Nonr-591 (09),NSF-GP-4177 Proj. NR-187-204,
Unclassified report

Availability: Published in The Journal of the Acoustical Society of America, v39 n2 p280-8 Feb 1966. Copies to DDC users only.

Descriptors: (*Acoustics, Underwater sound), (*Underwater sound, Sound transmission), Statistical analysis

Under the assumption that deep-water ocean noise is a superposition of uncorrelated plane waves, the covariance can be expressed in terms of the noise directivity. A simple directivity function is proposed that agrees with experimental results and it is used to study the covariance for the case of vertical receiving points. Covariance versus spacing for zero time delay and various directivities and bandwidth are investigated. When almost all of the noise arrives from the horizontal, the zero-delay covariance is always positive; when most of the noise arrives from overhead, it is negative for some spacings. Contours are presented of constant covariance as a function of spacing and time delay for various directivities and a narrow frequency band. Also covariance is examined for single -frequency noise. Vertical noise with steering towards the vertical and horizontal noise with steering towards the horizontal are found to give the same covariance values. Maximum covariance is examined over time delay and also that delay for which maximum covariance occurs. Numerous comparisons are made between the predictions and published experimental results. Finally, covariance for horizontal receiving points is considered. (Author)

AD-632 529 Fld. 20/1, 19/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
UNDERWATER SHOCK WAVE FREQUENCY SPECTRUM ANALYSIS. V. SPECTRA OF REFRACTED PULSES COMPARED WITH ISOVELOCITY SHOCK WAVES,
by Mary Alice Genau. 17 Mar 66, 24p. Rept. no. NOLTR-66-4,
Proj. NOL-785/ARPA,
Unclassified report

See also AD-628 936.

Descriptors: (*Shock waves, Acoustic properties), (*Underwater explosions, Shock waves), Frequency, Spectroscopy, Analysis, Explosion effects, Propagation

Fourier integral spectra of refracted shock waves from 56-lb TNT explosions fired at 50-ft depth were digitally computed on the IBM-7090. Comparisons were made between the spectra of various refracted pulses and the spectrum of the shock wave expected in isovelocity water at the same distance. Pulses received in the 'shadow zone', at the caustic, and in the region of multiple arrivals of the ray pattern were analyzed. The maximum spectral density level increases as the impulse increases; spectral oscillations are a function of surface cut-off times and of the difference in arrival times of the multiple peaks. (Author)

AD-632 607 Fld. 20/1, 4/1
CFSTI Prices: HC $3.00 MF $0.50
ARMY MISSILE COMMAND REDSTONE ARSENAL ALA PHYSICAL SCIENCES LAB
ON THE FREQUENCY OF RETURNING ACOUSTIC RAYS AND FOCUSING FOR HUNTSVILLE AND MISSISSIPPI TEST FACILITY.
Technical rept.,
by Oskar M. Essenwanger. 21 Jan 66, 55p.
AMC-RA RR-TR-66-2
Unclassified report

Descriptors: (*Acoustics, Focusing), (*Sound transmission, Atmosphere), (*Captive tests, Acoustics), Meteorology, Sound, Propagation, Atmospheric refraction, Rocket research, Test facilities, Alabama, Mississippi

The problem of acoustic focusing by returning sound rays from the atmosphere in the Huntsville and Mississippi Test Facility is analyzed in this report. First, an objective criterion to determine focusing by computer methods from the atmospheric data and the derived sound speed profile is presented. Afterwards, the empirical probability of focusing is derived for four seasons for the event of a test firing, as a function of the azimuth and with its areal distribution. In short, returning rays in the afternoon hours can be expected in 25 percent of the firings in summer and 90 percent in winter; however, focusing chances are 10 percent in summer and 50 percent in winter. The azimuthal variation ranges from around 60 percent for easterly to 5 percent for westerly directions in wintertime and reduces to 10 to 1 percent, respectively, in summer. Average chances for focusing encountered by isolated targets of limited areal extent may be as high as 20 percent in wintertime, while they stay below 5 percent in summer. The wind influence is considerably higher than commonly assumed. Practically all focusing in summer can be attributed to the superposition of the wind profile upon the temperature profile. Only 10 to 15 percent of focusing in the winter afternoon hours is caused by the structure of the temperature profile (inversions). (Author)

AD-632 009 See Fld. 17/1

AD-632 106 See Fld. 8/13

AD-632 396 See Fld. 13/7

20/2. CRYSTALLOGRAPHY

AD-631 969 Fld. 20/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
DETERMINATION OF THE FORM OF DIAMOND CRYSTALS FROM THEIR ATOMIC STRUCTURE.
Research translation,
by O. M. Ansheles. Jan 66, 12p. Rept. no. T-R-584,

Contract AF 19 (628)-3880,
TT 66-61161

Unclassified report

Vyvod Formy Kristallov Almaza na Osnove ikh Atomnogo Stroeniya, trans. of Akademiya Nauk SSSR. Doklady, v101 n6 p1109-12 1955.

Descriptors: (*Diamonds, Crystal structure), Crystal growth, Atomic structure, Crystal lattices, USSR

An examination is made of how the principal faces, namely, the cube, rhombic dodecahedron, and octahedron, should grow and tangentially expand on a diamond crystal and what habit of natural diamond should be obtained in the process.

AD-631 994 Fld. 20/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE FORMATION OF THE TETRAGONAL BORON MODIFICATIONS BY SUBSTITUTION OF THE BERYLLIUM ATOM IN THE B2B12 LATTICE,
by H. J. Becher. 15 Mar 66. 14p. Rept. no. FTD-TT-65-798
TT 66-61164

Unclassified report

Unedited rough draft trans. of Zeitschrift fur Anorganische und Allgemeine Chemie (East Germany) v321 p217-23 1963.

Descriptors: (*Boron, Crystal structure), Beryllium compounds, Boron compounds, Crystal lattices, East Germany, Borides, Chlorides, Spectra (Infrared)

By heating BeB12 with BC13 in a closed tube, Be is substituted by B without changing of the crystal structure. The obtained boron is of > 99% purity and tetragonal structure. By this reaction the structural relation between BeB12 and the tetragonal boron modification was proved. IR examinations of alpha-boron, tetragonal boron and BeB12 allowed the assignment of internal vibrations of the B12-icosaedrons and of lattice vibrations. (Author)

AD-632 039 Fld. 20/2, 11/6
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y
THE EFFECT OF CARBON ON THE STRAIN-RATE SENSITIVITY OF IRON SINGLE CRYSTALS.
Revised ed.,
by D. F. Stein. 1 Jun 65. 9p. Contract DA-31-124-ARO (D)-95,
AROD 4074:1

Unclassified report

Revision of manuscript submitted 15 Apr 65.

Availability: Published in Acta Metallurgica v14 p99-104 Feb 1966. Copies to DDC users only.

Descriptors: (*Iron, *Single crystals), Carbon, Impurities, Strain (Mechanics), Sensitivity, Crystal lattice defects, Stresses

The strain-rate sensitivity of iron crystals containing carbon in the range of 0.005 to 500 pm has been examined at 298 and 198K. The strain-rate sensitivity was related to the dislocation velocity exponent using the strain-rate change technique of Johnston and Stein. It was found that the dislocation velocity exponent increased with increasing carbon content at 298K and was approximately constant at 198K. The strain-rate sensitivity was examined on the basis of the various theories that relate strain-rate sensitivity to the dislocation obstacles responsible for the lattice friction stress in iron. It was concluded that strain-rate sensitivity of the crystals cannot be adequately explained on the basis of a single thermally activated process. (Author)

AD-632 159 Fld. 20/2, 20/12
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
LATTICE CONSTANTS OF ULTRAPURE PHENANTHRENE.
Physical Sciences Research papers,
by E. T. Peters, Alton F. Armington, and Bernard Rubin. 2 Mar 65. 6p. Rept. no. afcrl-66-231,AFCRL-PSRP-210
Proj. AF-5620, Task 562004,

Unclassified report

Prepared in cooperation with ManLabs, Inc., Cambridge, Mass.

Availability: Published in Journal of Applied Physics, v37 n1 p226-7 Jan 1966. Copies to DDC users only.

Descriptors: (*Phenanthrenes, *Crystal lattices), Zone melting, Semiconductors, Organic materials, Resistance (Electrical), X-ray diffraction analysis, Phase studies, Transformations, Thermal expansion

Ultrahigh-purity phenanthrene was prepared by multiple zone-refining. To determine if a resistivity anomaly observed at 68C is associated with a polymorphic transformation, x-ray diffraction scans were made at 26 and 84C. There is no evidence for a polymorphic transformation over this temperature range, although anisotropic behavior was noted for the thermal expansion coefficients. Precision lattice constants were determined for the monoclinic cell of phenanthrene at 26C; these are a zero = 8.4744A, b zero = 6.1720A, c zeros = 9.4805A, Beta = 98 degrees 01 min. (Author)

AD-632 554 Fld. 20/2, 11/6, 20/12
CFSTI Prices: HC $1.00 MF $0.50
ARIZONA UNIV TUCSON DEPT OF METALLURGICAL ENGINEERING
A CINEPHOTOMICROGRAPHIC STUDY OF DYNAMIC DISLOCATION PHENOMENA IN CRYSTALS.
Final rept. 3 Mar 62-30 Jun 65,
by Louis J. Demer. Apr 66. 12p. Contract DA-ARO (D)-31-124-G288, Proj. AROD-3400-MC, AROD 3400:5

Unclassified report

Descriptors: (*Crystal lattice defects, *Photomicrography), Motion picture photography, Hardness, Surface properties, Semiconductors, Etching, Crystal growth, Crystals, X-ray diffraction analysis

A brief summary is presented of the investigations performed during specific studies were made of the indentation hardness of various crystals, certain dislocation phenomena in ionic crystals, and surface damage in semiconductor crystals. Experimental techniques employed in these studies included dislocation etch pitting, optical microscopy, and X-ray diffraction microscopy. Notes on the principal findings are presented. (Author)

AD-632 564 Fld. 20/2, 19/1
CFSTI Prices: HC $1.00 MF $0.50
MCCRONE (WALTER C) ASSOCIATES INC CHICAGO ILL
THE CRYSTALLOGRAPHY OF EXPLOSIVES.
Quarterly rept. no. 5, 14 Dec 62-14 Mar 63.
15 Jul 63. 8p. Contract DA-11-022-ORD-4090.

Unclassified report

Descriptors: (*Crystallography, *Explosive materials), Lead compounds, Azides, Crystal growth, Crystal lattices, Strain (Mechanics), Crystal structure, Impact tests, Sensitivity, Potassium compounds, PETN, HMX

Progress is reported on a study of crystal growth and the relationship between crystal lattice strain and sensitivity for alpha lead azide. Crystal structure determinations are being made for several azides and related compounds.

AD-631 904 See Fld. 6/1

AD-631 928 See Fld. 11/6

AD-631 987 See Fld. 7/2

AD-632 040 See Fld. 11/6

AD-632 316 See Fld. 20/12

AD-632 334 See Fld. 20/12

AD-632 383 See Fld. 20/12

AD-632 405 See Fld. 11/6

AD-632 434 See Fld. 11/6

AD-632 456 See Fld. 11/6

20/3. ELECTRICITY AND MAGNETISM

AD-631 855 Fld. 20/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SECONDARY ELECTRONIC EMISSION OF COPPER AND OF CERTAIN COATINGS,
by D. B. Diatroptov. 30 Mar 66. 13p. Rept. no. TT-65-1539,
TT 66-61136

Unclassified report

Unedited rough draft trans. of Elektronika Bo shikh Moshchnostei (USSR) n2 p148-56 1963

Descriptors: (*Copper alloys, *Secondary emission), Bronze, Beryllium alloys, Ion bombardment, Electron bombardment, Chemical milling, Copper compounds, Oxides, Coatings, Copper, Gold, Machining, USSR

Measured was the coefficient of secondary electronic copper emission, of kupalloy and beryllium bronze under vacuum conditions, characteristic for large separable electro-vacuum installations with vapor-oil pumps and rubber packings. Examined was the effect on secondary emission of electronic and ionic bombardment and a series of chemical and mechanical surface machining. Measurements were carried out with the aid of an ordinary electrostatic unit. A tantalum strip served as the cathode with thorium oxide, spot applied against the opening in the focusing electrode. The installation was placed in a sectional steel vacuum chamber, which is evacuated by an oily diffusion pump with nitrogen traps. Beam voltage and the primary and secondary electron currents are registered on a multiple point self-recording potentiometer, allowing one to remove dependence graphs of the secondary electronic emission coefficient.

AD-631 936 Fld. 20/3, 9/5, 20/14
CFSTI Prices: HC $3.00 MF $0.75
HUGHES AIRCRAFT CO FULLERTON CALIF
INVESTIGATION OF USE OF SUPERIMPOSED SURFACE WAVE MODES.
Final rept. no. 1, 1 Feb 65-31 Jan 66,
by N. S. Wong, S. Sheaffer, and R. Tang. 28 Feb 66. 90p. Contract AF 19 (628)-4984, Proj. AF-4600, Task 460002,
AFCRL 66-200-1

Unclassified report

Descriptors: (*Phased arrays, Impedance matching), (*Antenna arrays, *Impedance matching), Waveguides, Admittance, Electromagnetism, Electromagnetic waves, Boundary value problems, Antenna radiation patterns, Electrical engineering

A novel method of achieving a matched radiating element in a phased array antenna over a specified scan angle has been investigated. The radiating

element consists of an open-ended waveguide supporting the two lowest order modes. Each of these modes excites a surface w ve along the array. When appropriately super-imposed, the two surface waves yield the correct shape of mutual impedances which produce a constant driving point impedance over a specified scan angle when all elements in the array are driven. The existence of these surface waves has been verified by the experimental investigations. The near fields, both of the radiation and the induction types, were shown to be important under certain conditions. Using a scattering formulation instead of impedance formulation, this method of control of driving point impedance can be regarded as combining two or more modes such that the reflections of these modes tent to cancel each other at the driven terminals. A VSWR of less than 1.2 to 1 over a plus or minus 60 degrees scan angle from broadside was obtained theoretically for a linear array of open-ended waveguides supporting the two lowest order modes. (Author)

AD-631 959 Fld. 20/3, 9/1, 20/12
CFSTI Prices: HC $1.00 MF $0.50
RCA LABS PRINCETON N J
HIGH FIELD TRANSPORT IN INSULATORS.
Final rept., 28 Feb 63-28 Feb 66,
by A. Rose. 28 Feb 66, 6p. Contract DA-31-124-ARO (D)-84,
AROD 4017:11
Unclassified report

See also AD-446 518.

Descriptors: (*Electric insulation, *Transport properties), Leakage (Electrical), Electric fields, Field emission, Dielectrics, Semiconductors, Space charges, Photomultipliers, Semiconductor devices, Electric currents

The work reviews the state of the art on high field transport in insulators, reopens the question of the mechanism for dielectric breakdown, and underlines the difficulties in the way of achieving solid state multiplication in insulators. In spite of these difficulties, the far ranging significance of solid-state multipliers demands, in my opinion, that the program be continued until either such multiplication is achieved or its impossibility is firmly demonstrated.

AD-632 164 Fld. 20/3, 4/1, 20/9
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
INTERPRETATION OF THE FIRST-ORDER CORRECTION TO THE MAGNETIC MOMENT INVARIANT,
by R. H. Ball. Apr 66, 5p. Rept. no. P-3350,
Unclassified report

Descriptors: (*Magnetic moments, *Invariance), Equations, Van Allen radiation belt, Magnetic pinch

In the study of the permanence and stability of the Van Allen radiation belts and in studies of mirror machines, it is of particular importance to understand the nature and behavior of the adiabatic invariants of the particle motion. It is shown that the first-order correction to the 'magnetic moment' M or 'first adiabatic invariant' has a simple physical interpretation, and two simple expressions are shown for it.

AD-632 312 Fld. 20/3, 10/1, 9/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ELECTRON AND ION EMISSION OF CERTAIN MATERIALS IN CONNECTION WITH THEIR UTILIZATION IN A THERMOELECTRON ENERGY TRANSFORMER,
by B. I. Mikhailovskii. 29 Apr 66, 8p. Rept. no. FTD-TT-65-1614,
TT 66-61206
Unclassified report

Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v7 p75-7 1962.

Descriptors: (*Thermoelectricity, Materials), (*Cathodes (Electron tubes), Thermoelectricity), USSR, Thermionic emission, Thorium compounds, Dioxides, Zirconium compounds, Carbides, Lanthanum compounds, Borides, Measurement, Temperature, Cesium electron tubes

An investigation was made of the temperature dependence of electron and ion emission of Th02, AZrC, and LaB6 cathodes for thermoelectron energy transformers.

AD-632 377 Fld. 20/3, 7/4
CFSTI Prices: HC $2.00 MF $0.50
GENERAL DYNAMICS/FORT WORTH TEX NUCLEAR AEROSPACE RESEARCH FACILITY
DRIFT VELOCITIES OF SLOW ELECTRONS IN METHANE, ETHANE, ETHYLENE, PROPYLENE, ACETYLENE, AND 1-BUTENE.
Rept. for 1 Oct 64-30 Sep 65,
by C. R. Bowman, and D. E. Gordon. May 66, 35p. Rept. no. FZK-273,
Contract AF 29 (601)-6643, Proj. AF-6773,
Task 677302,
AFWL TR-66-6
Unclassified report

Descriptors: (*Electric currents, Velocity), (*Electrons, Velocity), (*Aliphatic compounds, Electrons), Methane, Ethylenes, Alkynes, Propenes, Momentum, Probability, Thermodynamics, Gases, Scattering

A double-shutter drift tube was used to measure the drift velocities of electrons in methane, ethane, ethylene, acetylene, propylene, 1-butene, and ethane-acetylene mixtures for low E/P values. The resulting data were analyzed to obtain values of momentum-transfer cross sections as a function of electron energy in the interval 0.01-0.063 ev. Cross sections for the individual gases were obtained by fitting power series in electron velocity to the slope of the drift velocity curves in the thermal equilibrium range, where the electron velocities can be represented by a Maxwellian distribution. Momentum -transfer cross sections for the dipolar gases--propylene and 1-butene--are compared with Altschuler's dipole scattering theory. (Author)

AD-632 557 Fld. 20/3, 20/12
CFSTI Prices: HC $4.00 MF $1.00
LOUVAIN UNIV (BELGIUM)
THERMOELECTRIC POWER OF POLYCRYSTALLINE BISMUTH: PHONON DRAG SIZE EFFECT.
Final scientific rept. 1 Dec 64-31 Dec 65,
by Jean-Paul Issi. Dec 65, 149p. Contract AF 61 (052)-776,
RADC TR-66-176
Unclassified report

Descriptors: (*Thermoelectricity, *Bismuth), (*Phonons, Thermoelectricity), Thickness, Electromagnetism, Resistance (Electrical), Band theory of solids, Quantum mechanics, Diffusion, Drag, Foils, Hall effect, Thermal conductivity, Belgium

It was found that the thermoelectric power of polycrystalline bismuth increases with decreasing thickness at room temperature. Parallel galvanomagnetic and resistivity measurements indicate that the mean free paths of the charge carriers remain unchanged in the range of thickness investigated. Applying Herring's simplified formula, combined with the law of emf's in parallel extended to three band conduction, it was found that a phonon-drag mechanism could explain the observed increase in TEP and the order of magnitude of the effect. The expected variation of the diffusion thermoelectric power with temperature in the range 80-300K was also computed, using the correct band structure and the temperature dependence of the density of free carriers. Besides, it was found that at 80K, the magnetoresistance is not the same for thin foils, whether the magnetic field is perpendicular or parallel to the surface of the foil. Some interesting features are noted about the low-field galvanomagnetic coefficients. (Author)

AD-631 859 See Fld. 20/9

AD-632 078 See Fld. 14/2

AD-632 088 See Fld. 20/8

AD-632 129 See Fld. 9/1

AD-632 148 See Fld. 20/14

AD-632 186 See Fld. 9/5

AD-632 207 See Fld. 14/2

AD-632 411 See Fld. 20/12

20/4. FLUID MECHANICS

AD-631 834 Fld. 20/4, 21/2
CFSTI Prices: HC $1.10 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
THE POTENTIAL FLOW OF A FLUID INTO A SAMPLING PROBE,
by Philip Rosen. 29 Jul 54, 10p. Rept. no. APL/JHU-CF-2248,
Contract NOrd-7386,
Unclassified report

Descriptors: (*Fluid flow, Probes), (*Gas flow, Combustion products), Velocity, Potential theory, Sampling

The velocity potential for a uniformly distributed sink disk is calculated. With this result the flow of a fluid into sampling probe is estimated. The distance from the probe at which the flow is distroted by a given amount is computed as a function of the sampling rate and an expression is given for the computation of the flow time from the above point to the probe. (Author)

AD-631 873 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
ON THE INTERACTION OF A TWO-DIMENSIONAL JET WITH A PARALLEL FLOW,
by Robert C. Ackerberg, and Alexander Pal. Sep 65, 58p. Rept. no. PIBAL-889,
Contract DA-44-177-AMC-91 (T)
Unclassified report

Descriptors: (*Jets, Injection), (*Two-dimensional flow, Jets), Pressure, Wake, Mathematical analysis, Stagnation point

The injection of a two-dimensional jet of total head H1 from an infinite plate into a uniform stream of lower total head H2 is considered, the fluids being assumed inviscid and incompressible. Steady, irrotational solutions of Euler's equations are found for H1/H2 approaching infinity. The region behind the jet is treated as a stagnant wake with constant pressure equal to that of the undisturbed stream, and the jet injection angle is fixed across the jet opening. When a thin jet approximation is combined with Bernoulli's principle, a non-linear boundary condition is derived along the vortex sheet separating the jet from the external flow. The resulting non-linear potential problem (in the plane of the complex velocity potential) for the external flow is shown by Pal to be equivalent to a variational problem. A numerical procedure based on the variational principle and the Ritz -Galerkin method is used to solve for the case of normal injection with a digital computer. The pressure distribution along the plate upstream and streamline diagrams are given. (Author)

AD-631 946 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING
RADIATING HYPERVELOCITY COUETTE AND BOUNDARY LAYER FLOW IN AIR,
by Merwin Sibulkin. Apr 66, 28p. Rept. no. 13, Contract Nonr-562 (35), Proj. NR-061-132,
Unclassified report

Descriptors: (*Couette flow, Thermal radiation), (*Boundary layer, Thermal radiation), Thickness, Optical properties, Laminar flow, Flat plate models, Air, Heat transfer coefficients, Numerical analysis

An analytical solution for high speed Couette flow of a gray gas is given for the situation in which the dominant physical mechanisms are the production of energy by viscous dissipation and its transfer by radiation. The analysis is extended to air for the non-gray, optically thin case including thermal conduction, and numerical results are presented to show the range of validity of the radiation controlled solution. The Couette flow results are then applied to the problem of the hypervelocity, laminar boundary layer on a flat plate in air. An approximate expression for the Planck mean absorption coefficient of air is used, and the results obtained confirm the hypotheses that these boundary layers will be optically thin and radiation controlled. The analysis results in simple expressions for estimating the boundary layer temperature and heat transfer coefficient. (Author)

AD-631 960 Fld. 20/4, 20/13
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ONSET OF THERMAL INSTABILITY IN A HORIZONTAL CIRCULAR CYLINDER,
by Michael Sherman. Apr 66, 30p. Rept. no. RM-4820-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Convection (Heat transfer), Cylindrical bodies), Thermal stability, Fluid mechanics, Calculus of variations

The classical Rayleigh thermal-stability problem of an infinite horizontal fluid layer heated from below is extended to the case of a fluid confined within a rigid, horizontal circular cylinder whose wall is nonuniformly heated. The temperature distribution on the wall is specified such that in the quiescent state, a constant temperature gradient in the fluid is established in the direction of the body force. The governing perturbation equations form a self-adjoint eigenvalue problem for the critical Rayleigh number (the stability criterion). Two different variational principles are presented, each equivalent to the eigenvalue problem. Using these principles, two approximate methods are developed for calculating upper bounds to the critical Rayleigh number. It is found that the critical Rayleigh number for the cylindrical configuration (based on a unit diameter) is about 3.8 times that for the horizontal-layer configuration (based on a unit height). The value for the cylinder is considerably lower than values calculated in previous analyses. (Author)

AD-631 971 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
RESULTS OF CALCULATION OF THE BOUNDARY LAYER OF BLUNTED CONES IN SUPERSONIC FLOW.
Research translation,
by A. L. Ankudinov. Mar 66, 14p. Rept. no. T-R-591,
Contract AF 19 (628)-3880,
TT 66-61163
Unclassified report

Rezultaty Rascheta Pogranichnogo Sloya na Zatuplennykh Konusakh v Sverkhzvukovom Potoke, trans. of Zhurnal Vychislitelnoi Matematiki i Matematicheskoi Fiziki (USSR) v5 n5 p960-6 1965.

Descriptors: (*Conical bodies, Supersonic characteristics), (*Blunt bodies, Supersonic characteristics), (*Supersonic flow, *Boundary layer), Walls, Temperature, Thermal insulation, Matematical analysis, USSR

The paper presents the results of the calculation of the boundary layer of spherically blunted cones in supersonic airflow for a given (constant) wall temperature and for a thermally insulated wall.

AD-632 077 Fld. 20/4, 19/8
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
PITCHING MOTIONS OF A MOORED SUBMERGED MINE IN WAVES.
Final rept.,
by J. N. Newman, P. Plaia, and E. E. Zarnick. Mar 66, 30p.
DTMB 2151 ,NOL WR-5-0044
Unclassified report

Descriptors: (*Naval mines, *Pitch (Motion)), (*Underwater mines, Pitch (Motion)), Mooring, Hydrodynamics, Theory, Experimental data

This report describes a theoretical and experimental investigation of the pitching motions of a moored, submerged mine. The theoretical predictions are based upon linearized-wave theory as well as the assumptions that the body is slender and axisymmetric and is ballasted to be at equilibrium in the horizontal plane. The mooring cable is assumed to be massless and inelastic; the fluid is assumed to be inviscid. The theory results in an equation of undamped motion. Parallel experimental results were obtained on a 2-foot long model in wavelengths ranging from 15 to 55 feet, and these results confirm the theoretical predictions except in the vicinity of resonance, where viscous damping is important. Full-scale predictions are made for the root-mean-square pitching motions in Sea States 4 through 7 for two proposed mine configurations at various depths of submergence. The predicted values are from 1 to 9 degrees in Sea State 4, depending on depth and mine configuration, increasing to greater than 25 degrees in Sea State 7. (Author)

AD-632 097 Fld. 20/4, 12/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY MISSILE COMMAND REDSTONE ARSENAL ALA ARPA DIV
ON THE INTEGRATION OF COUPLED NONLINEAR EQUATIONS IN BOUNDARY LAYER THEORY WITH SPECIFIC REFERENCE TO HEAT TRANSFER NEAR THE STAGNATION POINT IN THREE-DIMENSIONAL FLOW,
by A. A. Hayday, and D. Bowlus. 24 Jan 66, 26p. AMC-RN TR-66-3
Unclassified report

Descriptors: (*Integration, *Nonlinear differential equations), (*Boundary layer, Theory), (*Heat transfer, Three-dimensional flow), Boundary value problems, Incompressible flow, Equations of motion, Laminar flow, Numerical analysis

The purpose of this report is to indicate the accuracy of the asymptotic method in solving systems of nonlinear differential equations in contrast to the methods that deal with a single equation. Also, a ready comparison with corresponding numerical solutions is made by considering a general three-dimensional flow of a viscous incompressible fluid in the vicinity of a stagnation point on a regular surface. (Author)

AD-632 110 Fld. 20/4
CFSTI Prices: HC $11.60 MF $0.75
COLORADO STATE UNIV FORT COLLINS FLUID MECHANICS PROGRAM
VELOCITY DISTRIBUTIONS IN THE SEPARATED FLOW BEHIND A WEDGE SHAPED MODEL HILL.
Technical rept.,
by Shih-Cheng Chang. Mar 66, 117p. Rept. no. CER65SCC66,
Contract DA-AMC-28-043-G20,
Unclassified report

Descriptors: (*Flow separation, Velocity), (*Wedges, Flow separation), Jet mixing flow, Turbulence, Incompressible flow, Models (Simulations)

A portion of the velocity distributions in an incompressible turbulent separated flow behind a two-dimensional model hill is investigated experimentally. A 2 in x 2 in wedge is used as a model hill. The mixing region investigated lies between the crest of the hill where the flow separated, and the reattachent point where the separated flow reattaches itself to the floor. Gortler's half-jet mixing theory is used to analyze the separated flow which is curved by the action of the pressure gradient across the separated flow. The width of the mixing region was found to spread linearly with the distance as expressed by the half-jet theory. If a suitable similarity parameter is chosen, the theoretical velocity distribution of half-jet agrees satisfactorily with the experiments, except in the region near the floor and directly behind the hill. However, it was found that the similarity parameter is not a constant, but is proportional to the one-half power of the distance downstream from the hill. Corrections were applied to account for the effects of the initial boundary layer thickness and for the curvature. The corrections are based on Sawyer's first order theory and Kirk's approximation, but the results indicate that these effects should be investigated further. (Author)

AD-632 222 Fld. 20/4, 12/1
LABORATOIRE DE PHYSIQUE THEORIQUE ET HAUTES ENERGIES ORSAY (FRANCE)
INTEGRAL EQUATION FOR CLASSICAL FLUIDS AND THE LATTICE GAS,
by D. Levesque, and L. Verlet. 8 Jun 64, 2p.
Contract AF-EOAR-63-47,
AFOSR 65-0831
Unclassified report

Availability: Published in Physics Letters v11 n1 p36-7 Jul 1 1964. Copies to DDC users only.

Descriptors: (*Fluids, Statistical functions), (*Integral equations, Fluids), Gases, Stability, Multiphase flow, Approximation (Mathematics), France

Various integral equations have been proposed recently to calculate the two-body correlation function of classical fluids. One of them, the so-called hypernetted chain (HNC) equation, may be obtained either by summing the terms of the cluster expansion of the correlation function which involve only convolution integrals or by a new approximation scheme introduced by Percus. In order to gain more insight on these equations, they were applied to the lattice gas with an interaction w with the nearest neighbours.

AD-632 257 Fld. 20/4, 20/9
COLUMBIA UNIV NEW YORK PLASMA LAB
STRONG SHOCK WAVES,
by Robert A. Gross. 1965, 6p. Contract AF 49 (638)-1634,
AFOSR 66-0060
Unclassified report

Availability: Published in Physics Today p20-4 Oct 1965. Copies to DDC users only.

Descriptors: (*Shock waves, Scientific research), Magnetohydrodynamics, Temperature, Velocity, Propagation

Strong shock waves can create very hot plasma. What temperatures can shock waves produce. What physical phenomena become important with increasing shock speed. What is the present state of our understanding of shock waves, where do they occur in nature, and how strong a shock wave can now be produced in laboratory devices. These are the questions discussed below. (Author)

AD-632 263 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
THE EFFECT OF FLUID INJECTION ON THE INCOMPRESSIBLE LAMINAR BOUNDARY LAYER OVER A SLENDER PARABOLA OF REVOLUTION.
Final rept.,
by Lorenzo M. Albacete. 25 Feb 66, 35p. Rept. no. NOLTR-65-226,Aeroballistics Research-237 Task RMGA-81-034,

Unclassified report

Descriptors: (*Laminar boundary layer, Separation), (*Slender bodies, Skin friction), Injection, Incompressible flow, Numerical analysis

The combined effect of transverse curvature and fluid injection on the incompressible laminar boundary layer over a parabola of revolution with zero pressure gradient has been examined. This was done by extending the asymptotic solution of Mark to include the effect of injection. In addition, results for finite values of the transverse curvature were obtained by means of a numerical solution of the differential equation. The results show that transverse curvature retards the injection-induced separation of the boundary layer. This allows for higher injection rates than would otherwise be possible. (Author)

AD-632 285 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CALCULATION OF A TURBULENT SUBMERGED STREAM OF REAL GAS,
by V. I. Bakulev. 29 Apr 66, 20p. Rept. no. FTD-TT-65-1923, TT 66-61199

Unclassified report

Unedited rough draft trans. of Inzhenernyi Zhurnal (USSR) v1 n3 p65-74 1961.

Descriptors: (*Turbulence, *Gas flow), Mathematical analysis, USSR

In this report is given a solution of a problem concerning boundary layer of the initial section of a plane -parallel stream of real gas with low temperature. The solution is based on the theory of free turbulence by Prandtl with the assumption, that the length of the displacement way in scalar values is greater than the vectorial values. For comparison are given calculations by Taylor's theory of free turbulence, in which it is assumed, that the tangent turbulent stresses are determined by the lateral transfer of wings and not by the amount of movement, as in the case of Prandtl.

AD-632 321 Fld. 20/4, 3/2, 20/9
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
HYDROMAGNETIC INSTABILITY OF FLUID BETWEEN TWO COAXIAL CYLINDERS,
by Chuen-Yen Chow, and Mahinder Uberoi. 5 Aug 64, 6p. Contract DA-31-124-ARO (D)-139, AROD 4445:43

Unclassified report

Prepared in cooperation with Colorado Univ., Boulder. Dept. of Aerospace Engineering Sciences.

Availability: Published in The Physics of Fluids v8 n3 0413-7 Mar 65. Copies to DDC users only.

Descriptors: (*Magnetohydrodynamics, Stability), Cylindrical bodies, Field theory, Fluid mechanics, Numerical analysis

When a uniform electric current is passed axially through a stationary fluid between two coaxial nonconducting cylinders with an electric current flowing along the axis, the fluid may become unstable due to the nonuniform electromagnetic body force field. By introducing an adjoint system of equations, the characteristic value problem is solved without the restriction of small spacing between the cylinders. Numerical results are given for the case when the ratio of the radii of the two cylinders is one-half. It shows that the wavenumber of the disturbance appearing in the fluid is a constant independent of the magnitudes of applied electric currents, which agrees with the result obtained under the narrow-gap assumption. (Author)

AD-632 323 Fld. 20/4, 18/10
CALIFORNIA UNIV BERKELEY
PRESSURE WAVE GENERATION IN A FISSIONING GAS. II. EFFECTS OF D/SSOCIATION AND MULTIPHASE COMPOSITION,
by H. P. Smith,Jr., R. D. Evans, C. W. Busch, and A. K. Oppenheim. 12 Apr 65, 5p. Contract AF-AFOSR-129-64, AFOSR 66-0064

Unclassified report

Availability: Published in The Physics of Fluids v8 n8 p1421-4 Aug 1965. Copies to DDC users only.

Descriptors: (*Fission, Pressure), (*Boron compounds, Dissociation), (*Neutron reactions, Pressure), Gases, Mechanical waves, Fluorides, Boranes, Azines, Boron, Thermodynamics, Fission products

The analysis of pressure pulses which are generated in a fissioning gas by neutron irradiation is extended to the case of a cissociating medium including a condensed phase. After a satisfactory check of the process induced in boron trifluoride that was treated previously, the analysis is applied to borazine for which the former met0od would be quite inadequate since now the effects of dissociation, involving the formation of free liquid boron, become predominant in controlling the thermodynamic behavior of the substance. (Author)

AD-632 369 Fld. 20/4
CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF THE AEROSPACE AND MECHANICAL ENGINEERING SCIENCES
DESORPTION RATES OF TWO-COMPONENT GAS MIXTURES FROM AN ADSORBENT BED,
by S. S. Penner, J. L. Lauer, and S. S. McElmury. 10 Aug 65, 8p. Contract DA-ARO (D)-31-124-G504, AROD 4479:9

Unclassified report

Availability: Published in Physics of Fluids v9 n2 p390-7 February 1966. Copies to DDC users only.

Descriptors: (*Gases, *Sorption), Adsorption, Mixtures, Laval nozzles, Physical chemistry, Mathematical analysis, Argon, Carbon dioxide, Nozzle gas flow, Helium

Theoretical expressions for the discharge rates of multicomponent gas mixtures through a de Laval nozzle from a closed chamber containing an adsorbent bed are calculated by using an extension of earlier studies on one-component systems. Representative experimental measurements on two-component systems were interpreted on the assumption that one of the constituents is not adsorbed appreciably. Proper utilization of the theoretical formulas requires simultaneous measurements of gas pressure and composition as a function of time. (Author)

AD-632 382 Fld. 20/4
NEBRASKA UNIV LINCOLN DEPT OF MECHANICAL ENGINEERING
EXPERIMENTAL DETERMINATION OF THE CRITICAL REYNOLDS NUMBER FOR PULSATING POISEUILLE FLOW,
by Turgut Sarpkaya. 1965, 10p. Rept. no. Paper no. 66-FE-5, Contract DA-ARO (D)-31-124-G261, AROD 3202:3

Unclassified report

Availability: Published in Transactions of the ASME Journal of Basic Engineering. Copies to DDC users only.

Descriptors: (*Fluid flow, Reynolds number), Laminar boundary layer, Stability, Turbulence, Viscosity, Hydrodynamics

The stability of fully developed Poiseuille flow pulsating under a harmonically and a nonharmonically varying pressure gradient was studied experimentally. The characteristics of turbulent plugs were determined for both steady and pulsating flow by means of pressure transducers. It was found that (a) for oscillating, stable Poiseuille flow, the phase angles determined experimentally agree well with those determined theoretically; (b) for the same mean pressure gradient, pulsating flow is more stable than the corresponding steady Poiseuille flow; (c) in pulsating flow, the presence of one or more inflection points is necessary but not sufficient for instability; and (d) the curves of the critical Reynolds number versus the relative amplitude of the periodic component of the cross-sectional mean velocity reach their maximum when at least one inflection ring continues to exist a time period 53 percent of the period of oscillation. (Author)

AD-632 400 Fld. 20/4
CFSTI Prices: HC $4.00 MF $0.75
RAND CORP SANTA MONICA CALIF
THE TURBULENT BOUNDARY LAYER IN A COMPRESSIBLE FLUID,
by Donald E. Coles. 22 Aug 61, 106p. Rept. no. P-2417,

Unclassified report

Availability: Microfiche only after original copies exhausted. Copies to DDC users only.

Descriptors: (*Turbulent boundary layer, (Compressible flow), Transformations (Mathematics), Two-dimensional flow, Shear stresses, Wake, Fluids, Walls, Equations

The first object of the paper is to develop a transformation which reduces the boundary-layer equations for compressible two-dimensional mean turbulent motion to incompressible form. The second object is to apply this transformation to the special case of the adiabatic turbulent boundary layer on a smooth wall. The transformation represents at every stage a genuine kinematic and dynamic correspondence between two real flows, both of which are capable of being observed experimentally. Since the mean pressure and mean velocity can then be measured in either flow, the mean acceleration of the fluid can in principle be determined, and the shearing stress can be adequately and accurately defined as the stress which is necessary to account for this acceleration. This formulation leads to a general transformation valid for laminar or turbulent flow in wakes and boundary layers, without regard to the state or energy equations or the viscosity law for the compressible fluid, and without regard to the boundary conditions on surface pressure or temperature in the event that a surface is involved. (Author)

AD-632 415 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
AEROJET-GENERAL CORP DOWNEY CALIF
INVESTIGATION OF THE COALESCENCE OF WATER DROPS.
Final rept. no. 2, 15 Feb 65-14 Feb 66,
by G. J. Woffinden. Apr 66, 35p. Contract DA-

28-043-AMC-00497 (E), Task 1V0-14501-B-53A-06,
ECOM TR-00497-2

Unclassified report

See also AD-623 714.

Descriptors: (*Water impingement, Nucleation), (*Aerosol generators, Liquid jets), (*Nucleation, Water), Clouds, Fog, Water vapor, Drops, Coagulation, Electrostatics, High-speed photography, Fluid mechanics

Experimental techniques have been developed for producing uniform water drops from 25 to 500 microns in diameter. The droplets are formed from a pressure -modulated water jet as it passes through a tiny orifice. Orifices with diameters as small as 20 microns have been used. The water pressure is modulated with a piezoelectric ceramic transducer oscillated at approximately 160,000 cps for the smallest droplets. The harmonic vibration of the transducer provides a stream of reproducible droplets at controllable intervals. The drop generator was designed for use in studying the coalescence of cloud and fog-sized water droplets under various environmental conditions, and high-speed photographic techniques were developed to measure coalescence delay times. (Author)

AD-632 428 Fld. 20/4
BROWN UNIV PROVIDENCE R I
SHOCK STRUCTURE IN A VISCOELASTIC FLUID,
by A. C. Pipkin. 16 Mar 65, 7p. Contract DA-ARO (D)-31-124-G484,
AROD 1271:47

Unclassified report

Availability: Published in Quarterly of Applied Mathematics v23 n4 p297-301 Jan 1966. Copies to DDC users only.

Descriptors: (*Fluids, Viscoelasticity), (*Shock waves, Fluids), Equations of motion, One-dimensional flow, Propagation, Sound

AD-632 431 Fld. 20/4
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
SPECTRUM OF HOMOGENEOUS TURBULENCE IN THE FINAL STAGE OF DECAY.
Revised ed.,
by D. A. Lee. 3 Jun 65, 4p. Rept. no. ARL-66-0039,

Unclassified report

Revision of manuscript submitted 22 Mar 65.

Availability: Published in The Physics of Fluids v8 n10 Oct 1965. Copies to DDC users only.

Descriptors: (*Turbulence, *Statistical mechanics), Tensor analysis, Fluid mechanics

AD-632 435 Fld. 20/4
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
DECAY OF SCALAR QUANTITY FLUCTUATIONS IN A STATIONARY ISOTROPIC TURBULENT VELOCITY FIELD,
by Jon Lee. 17 May 65, 14p. Rept. no. ARL-66-0043,

Unclassified report

Availability: Published in The Physics of Fluids v8 n9 p1647-58 Sep 1965. Copies to DDC users only.

Descriptors: (*Turbulence, *Statistical mechanics), Numerical analysis, Tensor analysis, Fluid mechanics

The direct interaction approximation suggested by Kraichnan is used to study the scalar mixing problem in a stationary isotropic turbuelnt velocity field. The main part of this paper deals with the decay of scalar quantity fluctuations in a simplified stationary velocity field. The numerical integration of the direct interaction equations was carried out with several different initial spectra for Peclet numbers of 50 and 500. The results seem to demonstrate naturalness of the direct interaction approximation; however, no comparison with experiments can be made at present. (Author)

AD-632 440 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
INVISCID FLOW FIELD PAST A POINTED CONE AT AN ANGLE OF ATTACK. PART I - ANALYSIS.
Technical rept.,
by G. Moretti. 15 Dec 65, 45p. Rept. no. TR-577,
Contract SD-149,ARPA Order-396 Proj. 8030/0650,

Unclassified report

Descriptors: (*Conical bodies, *Fluid flow), Angle of attack, Mathematical analysis, Shock waves, Gas flow, Entropy

The conical inviscid flow field past a circular cone at an angle of attack is obtained as the asymptotic stage of a three-dimensional flow. The latter is computed in a spherical frame by means of finite difference techniques associated with a method of characteristics on the shock and body. A brief critical discussion of previous papers on the subject and an analysis of the numerical results are given. Comparison with experiments shows that the applicability of the theory is severely limited by boundary layer effects. (Author)

AD-632 447 Fld. 20/4
DARTMOUTH COLL HANOVER N H
DERIVATION OF JET VELOCITY MODULATION CAUSED BY INJECTOR VIBRATION,
by P. D. McCormack, L. Crane, and S. Birch. 2 Aug 65, 4p. Contract AF-EOAR-43-65,
AFOSR 66-0351

Unclassified report

Prepared in cooperation with Trinity Coll., Dublin (Eire).

Availability: Published in British Journal of Applied Physics v16 p1911-3 1965. Copies to DDC users only.

Descriptors: (*Liquid jets, Modulation), Velocity, Injectors, Orifices, Vibration, Fluid mechanics

A method of establishing the velocity modulation produced in a jet as a result of transverse vibration is described. Results are quoted for water and paraffin jets. The method is based on measuring the diameter of the disks, or plates, produced on the jet and using Hartman's formula to deduce the velocity modulation at the orifice. (Author)

AD-632 465 Fld. 20/4
CFSTI Prices:MF $0.75
PENNSYLVANIA STATE UNIV UNIVERSITY PARK ORDNANCE RESEARCH LAB
FLOW DISTRIBUTIONS IN A CONFINED VISCOUS VORTEX.
Technical memo.,
by T. Ginsberg. 14 Apr 66, 66p. Rept. no. TM-605.2621-04,
Contract NOw-65-0123-d,

Unclassified report

Descriptors: (*Vortices, *Fluid mechanics), Viscosity, Dynamics, Experimental data, Distribution

The flow distribution in a viscous vortex, contained in a short cylindrical chamber and driven by injection of fluid through the peripheral wall of the chamber, was investigated experimentally. The radial and axial distributions of the radial and tangential velocities were measured, using a two-dimensional yaw probe to measure flow direction and a pitot probe to measure the velocity head at a point in the flow field. The radial distribution of the static pressure was measured with static pressure taps in the upper end wall of the vortex chamber. It was found that the body of flow away from the end walls behaves approximately like an inviscid fluid in vortex flow, where the static pressure gradient is balanced by the centrifugal force on an element of fluid and where angular momentum is conserved. The axial distribution of radial velocity showed that the boundary layer carried a considerably larger mass flow per unit length of chamber than did the region away from the wall. The reduced centrifugal force on the fluid in the boundary layer, caused by friction at the wall, allowed a large net radial inflow of fluid to the center of the vortex.

AD-632 488 Fld. 20/4, 1/3
CFSTI Prices: HC $1.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C AERODYNAMICS LAB
STATIC TESTS OF TEN RELATED CIRCULAR SHROUD INLETS,
by Arthur E. Johnson, and William B. Maguire. Mar 66, 26p.
DTMB 2171 ,DTMB Aero-1104

Unclassified report

Descriptors: (*Shroud rings, Duct inlets), (*Duct inlets, Captive tests), (*Gas flow, Duct inlets), Shrouded propellers, Rings, Ground effect machines, Test equipment, Thickness, Models (Simulations), Flow separation

Static tests were made on a series of circular duct inlets designed to have minimum lip thickness. Measured surface static pressures are in excellent agreement with theoretical predictions. The minimum lip thickness of test inlets that did not have separated flow was 0.069, expressed as the ratio of lip thickness to internal duct diameter. Results indicate that flow will separate from the lip if the predicted lip surface pressure (suction) coefficient is greater than 6.0, but will not separate if the pressure coefficient is less than 4.5. (Author)

AD-632 520 Fld. 20/4, 1/2
CFSTI Prices: HC $3.00 MF $0.75
MISSISSIPPI STATE UNIV STATE COLLEGE DEPT OF AEROPHYSICS
AN INVESTIGATION OF END PLATES TO REDUCE THE DRAG OF PLANAR WINGS.
Technical rept.,
by Sean C. Roberts. Jan 66, 67p. Contract DA-44-177-AMC-892 (T), Task 1P121401A14203,
USAAVLABS TR-65-79

Unclassified report

Descriptors: (*Drag, Reduction), (*Wings, Drag), Metal plates, Low-drag airfoils, Stability, Aerodynamic configurations, Reynolds number, Research planes

An analytical and experimental study has been performed to determine the optimum design of end plates which have minimum parasite drag and maximum effect on induced drag. Experiments were performed in a smoke tunnel and at full-scale Reynolds numbers on a modified PA-18 Super Cub aircraft. Flat end plates were found to be relatively ineffectual as a means of reducing the induced drag of aircraft, and the undesirable effect of large flat plates on the directional stability of an aircraft was an important effect to be considered. Cambered wing tip plates are worthy of further consideration, since a 15 percent decrease of induced drag with a 12 percent increase of L/D ratio was obtained from the configurations tested. (Author)

AD-632 542 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV

LAMINAR INCOMPRESSIBLE LEADING AND TRAILING EDGE FLOWS AND THE NEAR WAKE REAR STAGNATION POINT.
Technical information series,
by S. Weinbaum. May 66, 57p. Rept. no. R66SD25,
Contract AF 04 (694)-897,

Unclassified report

R66SD18, superseded. Prepared for presentation at AGARD Specialists' Meeting at the von Karman Inst. for Fluid Dynamics, Rhode-Saint -Genese (Belgium), 10 May 66.

Descriptors: (*Leading edge, Laminar flow), (*Trailing edge, Laminar flow), (*Wake, *Stagnation point), Incompressible flow, Flow separation, Two-dimensional flow, Equations

The paper investigates the behavior of a viscous incompressible fluid in the vicinity of various two-dimensional separation and stagnation points. Locally valid series solutions to the Navier Stokes vorticity equation are developed to study the pressure-viscous force balance in the neighborhood of the singularity and the transition to the flow region where inertial effects are important. Solutions are presented for an arbitrary symmetric leading or trailing edge except for an arbitrary constant that depends on the wall shear. The solution for the near wake rear stagnation point shows that the wake cannot close in an arbitrary manner, but that the asymptotic direction of the dividing streamline prior to stagnation is a single valued function of the ratio of the velocity on the dividing streamline to that on the wake centerline. The blunt based trailing edge is examined from two viewpoints. One is analogous to Goldstein's development for the flat plate trailing edge in that it assumes a Blasius profile at separation. The other is a parametric study to explore the effect of upstream influence on the point of separation and the initial shape of the dividing streamline. (Author)

AD-632 594 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS LAB
DETERMINATION OF THE STATE OF THE ART IN TWO-PHASE GAS-LIQUID FLOW PHENOMENON.
Final rept., 1 Feb 61-31 Dec 65,
by S. W. Gouse,Jr.. 15 Apr 66, 6p. Contract Nonr-1841 (73), Proj. DSR-8734,

Unclassified report

Descriptors: (*Two-phase flow, State-of-the-art reviews), (*Gas flow, Two-phase flow), (*Liquids, Two-phase flow), Research program administration, Bibliographies

The purpose of the program was to conduct an extensive and detailed study of the literature on two-phase gas-liquid flow phenomena and to compile the results of such a study in a useful form. A three-part bibliography and subject index to the literature were published listing and indexing by subject 5,253 separate references on two-phase gas-liquid flow phenomena, excluding the problem areas of condensation, cavitation, and atomization. Four technical reports, presenting reviews of various problem areas were also completed and distributed. (Author)

AD-631 859 See Fld. 20/9

AD-631 872 See Fld. 21/5

AD-631 933 See Fld. 14/2

AD-631 945 See Fld. 20/1

AD-632 010 See Fld. 8/3

AD-632 085 See Fld. 14/2

AD-632 124 See Fld. 20/13

AD-632 207 See Fld. 14/2

AD-632 294 See Fld. 8/3

AD-632 361 See Fld. 12/2

AD-632 384 See Fld. 19/4

AD-632 386 See Fld. 22/2

AD-632 388 See Fld. 20/13

AD-632 398 See Fld. 1/3

AD-632 436 See Fld. 13/11

AD-632 517 See Fld. 14/2

AD-632 536 See Fld. 16/2

AD-632 575 See Fld. 21/2

20/5. MASERS AND LASERS

AD-631 973 Fld. 20/5, 20/6, 7/3
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
RESEARCH IN THE USE OF LIGHT AMPLIFICATION BY STIMULATED EMISSION IN ENERGY TRANSFER.
Final scientific rept., 15 Nov 64-15 Nov 65,
by Richard N. Griffin, and B. Linder. Jan 66, 48p. Contract AF 33 (615)-2230, Proj. AF-7023, ARL 66-0002

Unclassified report

Descriptors: (*Phosphorescence, *Organic compounds), (*Lasers, Organic compounds), Molecular energy levels, Life expectancy, Reaction kinetics, Europium compounds, Chelate compounds, Benzenes, Organic nitrogen compounds, Heterocyclic compounds

The kinetics of phosphorescence decay of ten organic compounds were measured. Some decay rates were found to be exponential within 1%, while others were either non-exponential at all stages or were resolved into a sum of exponential. The existence of multiple metastable triplet levels is proposed as the explanation of non-exponential decay. The usefulness of triplet -triplet absorption measurements in conjunction with phosphorescence decay measurements was demonstrated. It was shown that energy transfer from the donor is the rate controlling step in the phosphorescence decay of biphenyl in the carbazole-biphenyl system. An extremely efficient transfer of energy was observed from the triplet state of pyrazine to the singlet of a europium chelate, resulting in prolonged europium fluorescence. The observed kinetics can be explained in terms of a difference in the transfer efficiency of two forms of the pyrazine triplet. (Author)

AD-632 007 Fld. 20/5
CFSTI Prices: HC $3.00 MF $0.50
LENINGRAD POLYTECHNICAL INST KALININ (USSR)
SATURABLE FILTER INVESTIGATION.
Final technical rept.,
by L. A. Cross. Apr 66, 53p. Contract Nonr-4125 (00),ARPA Order-306-62 Proj. NR-015-702,

Unclassified report

Rept. on Proj. DEFENDER. See also AD-431 102.

Descriptors: (*Lasers, *Filters (Electromagnetic waves)), Materials, Glass, Uranyl radicals, Oscillators, Amplifiers, Cadmium compounds, Sulfides, Ruby, Doping, Absorption spectrum, Pumping (Electronics)

This report presents the results of the search for suitable saturable filter materials and the theoretical investigation of the saturation effect. The observation of saturation effects in uranyl glass filters is discussed. The effect of a saturable filter in the laser cavity is demonstrated with an experimental Q-switched laser. (Author)

AD-632 022 Fld. 20/5, 7/4
CFSTI Prices: HC $2.00 MF $0.50
PHILCO BLUE BELL PA APPLIED RESEARCH LAB
STUDY OF LOSS MECHANISMS AND STIMULATED RAMAN EMISSION.
Final technical rept., 1 May-3 Dec 65,
by C. C. Wang. Mar 66, 48p. Rept. no. A056-F, Contract Nonr-4850 (00),ARPA Order-306 Proj. 4730,

Unclassified report

Rept. on Proj. Defender.

Descriptors: (*Lasers, *Ramar spectroscopy), (*Benzene, Raman spectroscopy), (*Nitrobenzenes, Raman spectroscopy), (*Toluenes, Raman spectroscopy), (*Sulfides, Raman spectroscopy), Carbon compounds, Liquids

Extensive measurements were taken on the conversion efficiency and threshold of stimulated Raman emission in benzene, nitrobenzene, toluene, and carbon disulfide. It was shown that the self-focusing action of a laser beam is responsible for the onset of stimulated Raman emission. (Author)

AD-632 024 Fld. 20/5, 20/6, 7/5
CFSTI Prices: HC $2.00 MF $0.50
KORAD CORP SANTA MONICA CALIF
SPECTRAL PROPERTIES OF PASSIVELY Q-SPOILED LASERS.
Semiannual technical summary rept., 1 Oct 65-31 Mar 66,
by Bernard H. Soffer. 28 Apr 66, 31p. Contract Nonr-5150 (00),ARPA Order-306 Proj. NR-015-710,

Unclassified report

Rept. on proj. Defender.

Descriptors: (*Lasers, *Photochromism), Ruby, Impurities, Dyes, Phthalocyanines, Light, Diffusion, Optics, Spectroscopy, Quantum mechanics

A description of the problem and of experiments which bear on the problem of the spectral behavior of passive Q-switched lasers, and of the physical behavior of passive W-spoiling materials is given. The results of experiments of the temporal and frequency locking of two lasers coupled via a bleachable dye cell are described. A published article supported under this contract, is reproduced as an appendix. (Author)

AD-632 056 Fld. 20/5, 20/6, 20/9
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
THE EFFECT OF AXIAL MAGNETIC FIELDS ON GAS LASERS,
by Alan Corney. 10 Jun 65, 4p. Contract DA-31-124-ARO (D)-139,
AROD 4445:42

Unclassified report

Supported in part by ARPA, proj. Defender. Prepared in Cooperation with Colorado Univ., Boulder.

Availability: Published in Applied Optics v5 n1 p127-30 Jan 1966. Copies to DDC users only.

Descriptors: (*Lasers, *Magneto-optic effect), (*Magnetohydrodynamics, Lasers), Light transmission, Polarization, Electrooptics, Plasma physics, Optics, Gases

An expression is obtained for the intensity of polarized light transmitted through a laser amplifier and linear polarizer, as a function of the strength

of an axial magnetic field. The result is compared with an experiment reported by Hotz in which it was claimed that the natural width of the laser transition was measured. The effect of applying a magnetic field parallel to the axis of a laser having plane -parallel windows is also considered. The variation in the frequency of beats between oppositely circularly polarized modes, as a function of magnetic field, is obtained. The result shows that an experiment performed by Culshaw and Kannelaud cannot be interpreted as a level-crossing effect as was previously supposed.

AD-632 100 Fld. 20/5, 20/9
CFSTI Prices: HC $2.00 MF $0.50
ASTRO-ELECTRONICS DIV RADIO CORP OF AMERICA PRINCETON N J
CYCLOTRON RESONANCE PUMPING OF GAS LASERS.
Quarterly rept. no. 2, 1 Sep-30 Nov 65,
by S. Ahmed, and T. Faith. May 66, 31p. Contract DA-28-043-AMC-01376 (E), Proj. DA-1P6-22001-A-055-02-43,
Unclassified report

Descriptors: (*Lasers, Pumping (Electronics)), (*Pumping (Electronics), *Cyclotron resonance phenomena), Argon, Ionization, Excitation, Electric discharges, Direct current, Gas discharges, Microwave equipment, Cavity resonators, Quantum mechanics, Plasma physics

Experiments employing combined microwave electron -cyclotron resonance with d-c pumping as well as experiments with d-c pumping only were performed on argon lasers. Effort was directed towards clearly defining the effects of these pumping combinations on discharge behavior and laser operation. Results of these experiments show that in low-wall-loss magnetically confined d-c discharges, the gas pressure is greatly reduced by ion-drift pumping towards the cathode, and laser action takes place at considerably lower pressures than had hither-to been supposed. Microwave cyclotron -resonance pumping was seen to have a significant effect in increasing laser output. This increase in output occurred at high initial gas pressures, and is dependent on the magnetic field being at the resonance value. The laser tested was 40 centimeters long and 8 millimeters in diameter. It was fitted into a tunable microwave cavity within a magnetic solenoid. Measurements were made with both pulse and continuous operation. (Author)

AD-632 109 Fld. 20/5, 20/10
CFSTI Prices: HC $1.60 MF $0.50
BOSTON UNIV MASS DEPT OF PHYSICS
THEORETICAL RESEARCH ON LASER MODELS.
Final rept., 1 Feb 63-31 Mar 66,
by Charles R. Willis. 28 Feb 66, 15p. Contract AF 19 (628)-2460, Proj. AF-4645, Task 464502, AFCRL 66-166
Unclassified report

Descriptors: (*Lasers, Mathematical models), (*Quantum mechanics, Lasers), Atomic energy levels, Equations of motion, Electromagnetism, Optics, Theory

A theory is developed for the description and understanding of laser behavior from a fundamental microscopic point of view. The model consists of N two-level systems interacting with a radiation field. The problems of collective motion, coherence, dissipation and inhomogeneous broadening are treated. This report consists mainly of the abstracts of six papers dealing with these subjects that have or will appear in scientific journals. (Author)

AD-632 178 Fld. 20/5
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y
CHELATE LASERS.
Final rept. 1 Apr 63-31 Mar 66,
by A. Lempicki, H. Samelson, and C. Brecher. 30 Apr 66, 125p. Rept. no. TR-66-052.13, Contract Nonr-4134 (00),Order-306
Unclassified report

Descriptors: (*Chelate compounds, *Lasers), Pumping (Optical), Europium compounds, Acetones, Spectroscopy, Fluorescence, Molecular structure, Ketones, Chemical bonds, Benzophenones, Concentration (Chemistry), Solvents, Ions, Rare earth compounds

The physical properties and operating characteristics of chelate laser systems are defined. The limitations of chelate solutions in such systems are described in terms of the chemical behavior of the component materials, and the chemical and spectroscopic properties of the chelates themselves are elucidated. Approaches for overcoming the intense absorption which limits the performance of chelate lasers are proposed. The document is comprised largely of reprints from the following sources: J. Chem. Physics v40 p2547-2553, p2553-2558 1964; J. Chem. Physics v42 p1081-1096 1965; J. Chem. Physics v41 p1214-1224 1964; J. Chem. Physics v41 p279-280 1964; Applied Physics Letters v2 p159-161 1963; Nature v202 p580-581 1964; J. Chem. Physics v41 p3998-4000 1964; Applied Physics Letters v5 p173-174 1964; Applied Optics Suppl. 2 of Chemical Lasers p205-213 1965.

AD-632 306 Fld. 20/5
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA
GAS LASER STUDIES IN THE 100 TO 1000 MICRON RANGE.
Final rept.,
by Paul D. Coleman. 31 Dec 65, 11p. Contract AF-AFOSR-804-65, Proj. AF-9768, Task 976802,
AFOSR 66-0719
Unclassified report

Descriptors: (*Lasers, *Gases), Infrared radiation, Submillimeter waves, Molecular spectroscopy, Water vapor

The report summarizes the first year's activities of research on gas lasers in the 100 to 1000 micron range. A general description and experimental results of a water vapor laser covering the 48 to 118 micron range is described. Research problems to be explored during the second year of the grant are discussed along with a brief comparison with classical electronic methods of generation. (Author)

AD-632 416 Fld. 20/5, 7/4, 20/11
CFSTI Prices: HC $3.00 MF $0.75
BOSTON COLL CHESTNUT HILL MASS
AN INVESTIGATION OF PROPERTIES OF THE LASER MICROPROBE.
Final rept. pt 1, 1 Jul 64-13 Aug 65,
by James J. Devlin, and Anthony B. La Conti. 13 Aug 65, 89p. Contract AF 19 (604)-8819, Proj. AF-5620, Task 562003,
AFCRL 65-855-Pt-1
Unclassified report

Descriptors: (*Spectroscopy, *Lasers), Probes, Chemical analysis, Light pulses, Excitation, Sources, Iron alloys, Aluminum alloys, Quantum mechanics

An investigation of the Laser Microprobe as a source for emission spectrochemical analysis is reported. The size and character of the crater: burnt into a number of pure element metals was investigated. Working curves for a series of iron and aluminum alloys were produced. This gave a measure of the sensitivity and reproducibility of the Laser Microprobe. (Author)

AD-632 545 Fld. 20/5, 11/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
PREPARATION OF PLATINUM-FREE LASER GLASS.
Semi-annual technical rept. no. 3, 1 Jul-31 Dec 65,
by Richard F. Woodcock, George A. Granitsas, and Carl G. Silverberg. May 66, 18p. Contract Nonr-4656 (00),Order-306-62 Proj. 4730,
Unclassified report

See also AD-457 331.

Descriptors: (*Lasers, *Glass), (*Platinum, Lasers), Purification, Melting, Contamination, Containers, Ceramic materials, Extrusion, Neodymium

The goal of the investigation is the elimination of platinum particles in laser glass. For glasses melted in platinum crucibles, earlier work indicated that platinum -free glasses may be obtained if the glass is melted in an inert atmosphere. Various methods of homogenizing the glass in an atmosphere furnace, other than stirring, were investigated; including bubbling inert gas through the melt, convection currents and diffusion. A parallel approach to this problem, also being investigated, is the melting of high purity laser glass in an all-ceramic system. Such a system was constructed and tested. Problem areas were identified and design modifications were made where necessary. Optimization of the operational procedure of the furnace is now in progress. (Author)

AD-632 566 Fld. 20/5
CFSTI Prices: HC $3.00 MF $0.75
RAYTHEON CO WALTHAM MASS RESEARCH DIV
SPECTRAL AND MODE PROPERTIES OF SOLID-STATE LASERS AND OPTICAL DYNAMIC EFFECTS.
Final scientific rept. Jan-Dec 65,
by C. Tang, and G. deMars. Jan 66, 82p. Rept. no. S-852,
Contract AF 19 (628)-4981, Proj. AF-4645, Task 464502,
AFCRL 66-202
Unclassified report

Descriptors: (*Lasers, Optical properties), Thermal properties, Frequency, Ruby, Kerr cells, Electromagnetic pulses, Phase-locked systems, Garnet, Neodymium, Cavity resonators, Interferometers, Light pulses, Propagation

Experimental results of a direct measurement of the frequency shift of the output of a single-mode traveling wave ruby laser are reported. A description is included of the preliminary experimental results obtained in a successful attempt at eliminating this frequency shift by introducing a compensating phase shift in the optical cavity with the help of a nitrobenzene Kerr cell. Results of a detailed theoretical study and some preliminary experimental results on the phase locking of modes in solid state lasers are given. These results show the existence of and the reasons for such phase-locking effect. Results are reported of an attempt at obtaining single-mode operation of the YAG:Nd (3+) laser using the scheme suggested by Prokhorov, Burch, and Siegman. The results suggest that it is possible to achieve a single-mode operation with this scheme. Detailed results are given of a theoretical study on the shape of the resonant modes of the Fabry-Perot cavity of an oscillating solid state laser when the nonlinear spatial saturation effect is taken into account. Finally, a report is given of the results of a detailed study on the propagation of an intense light pulse through an optical medium.

AD-631 958 See Fld. 20/12

AD-631 993 See Fld. 20/9

AD-632 066 See Fld. 7/5

AD-632 425 See Fld. 9/3

AD-632 484 See Fld. 7/5

20/6. OPTICS

AD-632 014 Fld. 20/6, 20/8
CFSTI Prices: HC $3.00 MF $0.50
KANSAS STATE UNIV MANHATTAN
SENSITIZED FLUORESCENCE.
Final rept. 1 Apr 63-31 Dec 65,
by Basil Curnutte,Jr.. 31 Dec 65, 57p. Contract Nonr-3634 (02) ,ARPA Order-306-62
Unclassified report

Rept. on Proj. DEFENDER. See also AD-620 739.

Descriptors: (*Mercury, Fluorescence), (*Fluorescence, Quenching (Inhibition)), (*Thallium, Quenching (Inhibition)), (*Lasers, Electron transitions), Mercury, Vapors, Atomic energy levels, Resonance, Excitation, Probability

The quenching of mercury resonance fluorescence by thallium in a mercury-thallium vapor mixture has been measured to determine the quenching cross section of thallium for the 63 PI) state of mercury. The measurements for the quenching cross sections at 800, 850, and 900 degrees were 34 + or -13, 31 + or-8, and 25 + or -6 square Angstrom units respectively. The cross sections for the transfer of energy to several of the thallium excited states on collision of ground state thallium atoms with excited and metastable mercury atoms were determined by measurement of the relative intensities of thallium sensitized fluorescence radiation to mercury resonance fluorescence radiation. The implications of the magnitudes of these cross sections on the prospects for the use of a mercury - thallium vapor in a laser system are discussed. (Author)

AD-632 168 Fld. 20/6, 14/2
CFSTI Prices: HC $1.60 MF $0.50
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
THE INFLUENCE OF A SCANNING SLIT ON THE LINE PROFILE OBSERVED WITH A SPECTROGRAPH,
by Rolf Brahde. Oct 64, 17p. Rept. no. Scientific-3,
Contract AF 61 (052)-743,
AFCRL 66-216
Unclassified report

Astrophysica Norvegica v9 n21 p199-212 1965.

Descriptors: (*Spectrum analyzers, *Optics), Diffraction gratings, Collimators, Optical images, Light, Distribution, Mathematical analysis, Norway

In a spectrograph the diffraction profile of either a rectangular or a circular opening is folded with the image of two rectangular finite slits-the spectrograph slit and a scanning slit. The resulting intensity distribution has been studied for the two cases, incoherent and coherent illumination of the slit. (Author)

AD-632 169 Fld. 20/6, 14/2
CFSTI Prices: HC $1.60 MF $0.50
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
ABERRATIONS IN A SYSTEM OF TWO SPHERICAL MIRRORS, AND THEIR INFLUENCE ON THE LINE PROFILE OF A SPECTROGRAPH,
by Rolf Brahde. Jan 65, 19p. Rept. no. Scientific-4,
Contract AF 61 (052)-743,
AFCRL 66-217
Unclassified report

Astrophysica Norvegica v10 n1 p1-15 1965.

Descriptors: (*Spectrum analyzers, *Optics), (*Mirrors, Spectrum analyzers), Light, Distortion, Collimators, Spectrographic cameras, Norway

A system of exact ray-tracing formulae has been developed for two spherical mirrors. The bundles of rays are supposed to be paralell between the mirrors. For a particular case, ie. the mirrors used in the horizontal spectrograph in the tower telescope at the Oslo Solar Observatory, the formulae have been used to determine the aberrations in the focal plane of the second mirror. The influence of the aberrations on the line profile has been found. (Author)

AD-632 240 Fld. 20/6, 11/6, 20/6, 14/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB
UTILIZATION OF MASER AS A MEANS OF EXCITATION FOR THE SPECTROGRAPHIC EXAMINATION OF MICROSTRUCTURES OF METALS.
Final rept.,
by M. D. Smith, and J. F. Danovich. 31 Dec 65, 17p.
Unclassified report

Descriptors: (*Masers, Probes (Electromagnetic)), (*Lasers, Probes (Electromagnetic)), (*Microstructure, Laboratory equipment), Spectroscopy, Emissivity, Microstructure, Metals, Alloys, Ceramic materials, Refractory coatings, Ceramic coatings, Aluminum alloys, Tungsten compounds, Carbides, Silicon

Investigation of laser as a source of excitation for emission spectroscopy and techniques developed for its use in this capacity are reported. Results of qualitative detection of segregates and inclusions in metallic alloys and the limits of detection of various elements in aluminum standards by the techniques developed are presented in addition to investigations of this means of excitation for the analysis of ceramics and refractories. It is concluded that the results of investigation show the feasibility of the use of the Laser Microprobe as a means of excitation for emission spectrography. The techniques developed in the analysis of coatings and modifications of the objective lens have increased the versatility and scope of application. Although the laser microprobe offers many advantages over the arc-spark spectrographic source, it nevertheless possesses certain limitations which require that it be considered as a complementary accessory to extend the applications of emission spectroscopy. (Author)

AD-632 333 Fld. 20/6, 7/2
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
USE OF A CONTINUOUS SOURCE IN FLAME FLUORESCENCE SPECTROMETRY.
Revised ed.,
by Claude Veillon, J. M. Mansfied, M. L. Parsons, and J. D. Winefordner. 24 Nov 65, 7p. Contract AF-AFOSR-1033-66,
AFOSR 66-0589
Unclassified report

Revision of manuscript submitted 15 Sep 65.

Availability: Published in Analytical Chemistry v38 p204-8 Feb 1966. Copies to DDC users only.

Descriptors: (*Spectroscopy, Fluorescence), Flames, Electric arcs, Xenon, Chemical analysis, Argon, Hydrogen, Line spectrum, Zinc, Cadmium, Thallium, Gold, Copper, Silver, Bismuth, Magnesium, Mercury, Lead, Oxygen

Low limits of detection for 13 elements were obtained by atomic fluorescence flame spectrometry using a 150-watt xenon arc continuous source, a total-consumption atomizer-burner, and a low resolution monochromator. Some properties of a new flame, argon, hydrogen, entrained air, and scattering of incident radiation by salt particles in the flame gases were also studied. Copper, silver, gold, bismuth, magnesium, zinc, cadmium, mercury, and thallium exhibited relatively intense atomic fluorescence in flames excited by a continuous source. The shape of the analytical curves of zinc, cadmium, and thallium were different from those obtained with line sources. (Author)

AD-632 419 Fld. 20/6, 20/10
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
COHERENCE AND STATISTICS OF RADIATION,
by C. L. Mehta. 1964, 58p. Contract DA-ARO (D)-31-124-G569,
AROD 4965:15
Unclassified report

Presented at the Theoretical Physics Institute, University of Colorado, Summer 1964.

Availability: Published in Lectures in Theoretical Physics v8C p345-401 1965. Copies to DDC users only.

Descriptors: (*Light, *Quantum statistics), (*Lasers, Quantum statistics), (*Optics, Quantum statistics), Optical phenomena, Thermal radiation, Quantum mechanics, Physics, Theory, Spectroscopy

The report considers elementary concepts concerning optical coherence, more exact and quantitative measures of coherence, and the application of these concepts to spectroscopy and stellar interferometry. Following this, higher order coherence phenomena and some of their applications are examined. The essential differences between the light from a thermal source and that from an optical maser (laser) are also considered.

AD-632 603 Fld. 20/6, 13/10
CFSTI Prices: HC $1.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
THE DEVELOPMENT OF CHROMATICITY REFERENCES FOR CONSOLE SIGNAL LIGHTS.
Research and development phase rept.,
by Robert L. Booker, and George K. C. Hardesty.
Apr 66, 23p. Rept. no. MEL-91/66,
Proj. S-F021-02-02,S-F013-09-01 Task 9633,498
Unclassified report

Descriptors: (*Signal lights, Shipborne), (*Colors, Signal lights), Standards, Colorimetry

This report deals with the development of 20 colored plastic reference filters for which chromaticity coordinates, luminous efficiencies, and radiant transmittances are given. These filters can be used in conjunction with the MEL Color Demonstrator to demonstrate chromaticity limits visually, and they can be used to help 'color-correct' individual brightness photometers. (Author)

AD-631 851 **See Fld. 11/6**

AD-631 896 **See Fld. 4/1**

AD-631 903 **See Fld. 14/4**

AD-631 906 **See Fld. 14/4**

AD-631 907 **See Fld. 14/4**

AD-631 973 **See Fld. 20/5**

AD-632 024 **See Fld. 20/5**

AD-632 056 **See Fld. 20/5**

AD-632 343 **See Fld. 4/1**

AD-632 445 **See Fld. 7/4**

AD-632 608 **See Fld. 11/6**

20/7. PARTICLE ACCELERATORS

AD-632 510 Fld. 20/7
CFSTI Prices: HC $2.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
STANDING WAVE MODES IN A SUPERCONDUCTING LINEAR ACCELERATOR,
by T. I. Smith. Apr 66, 35p. Rept. no. HEPL-437,
Contract Nonr-225 (67),
Unclassified report

Descriptors: (*Linear accelerators, *Standing wave ratios), Superconductivity, Electron accelerators

In connection with the work on the superconducting linear accelerator, various accelerator structures have been considered. Because of its simplicity a standing wave structure is extremely attractive. Accordingly, this paper is devoted to an understanding of standing wave linacs. Although the results are applicable to conventional as well as to superconducting structures, the problems studied and the sample calculations given are appropriate for superconducting structures. (Author)

20/8. PARTICLE PHYSICS

AD-632 051 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
POSITIVE-PION PHOTOPRODUCTION AT 180 DEGREES NEAR THE SECOND NUCLEON-PION RESONANCE,
by C. Schaerf. Mar 66, 16p. Rept. no. HEPL-428,
Contract Nonr-225 (67),
Unclassified report

Descriptors: (*Photonuclear reactions, *Pions), Hydrogen, Electron bombardment, Photon bombardment, Gamma rays, Meson cross sections, Nuclear spectroscopy, Gamma-proton reactions, Nuclear magnetic resonance

In a previous experiment the cross section for the photoproduction of pions in hydrogen near the second pion nucleon resonance was measured at 135 degrees and 180 degrees in the CMS. At 180 degrees the measurements did show a very sharp peak at a gamma ray energy of 700 MeV. The experiment has now been repeated only at 180 degrees, with improved energy resolution. The new results, in agreement with the old ones, show the same sharp energy dependence at about the same value of the primary energy. (Author)

AD-632 088 Fld. 20/8, 20/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
NUMERICAL COMPUTATION OF IMAGE SIZE AND DISTANCE FOR CONVERGING CHARGED PARTICLE BEAMS.
Technical rept. (Research paper),
by H. B. Haskell, P. C. Johnson, and O. Heinz.
Apr 66, 34p. Rept. no. TR/RP-55,
Unclassified report

Descriptors: (*Space charge, *Electron optics), (*Ion beams, Focusing), Electrostatics, Charged particles, Particle beams, Ion sources, Electron guns, Numerical analysis

In this paper are presented the results of numerical computations of the effect of space charge upon the image size and image distance in a converging beam of charged particles. The minimum beam radius (image size) and its position (image distance) are plotted as a function of beam perveance ranging from 10 to the minus 13th power to 0.000001. The beam convergence angle was varied from about 0.03 to 0.15 radians and calculations were carried out for 3 values of aperture radius (0.1 cm, 0.25 cm and 0.50 cm). The results are given for electrons, 1H (+), 7Li (+), 20Ne (+), and 85Rb (+). (Author)

AD-632 258 Fld. 20/8, 7/4
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
THE EVALUATION OF TWO CENTER INTEGRALS INVOLVED IN THE CALCULATION OF THE INTENSITY OF DIFFRACTED ELECTRONS AND X-RAYS FROM MOLECULES,
by R. A. Bonham. 1 Mar 65, 6p. Rept. no. 1323,
Contract AF 49 (638)-1681, Proj. AF-9760,
Task 976001,
AFOSR 66-0585
Unclassified report

Prepared in cooperation with Tokyo Univ. (Japan). Dept. of Chemistry.

Availability: Published in Journal of the Physical Society of Japan v20 n12 p2260-2 Dec 1965. Copies to DDC users only.

Descriptors: (*Molecular orbitals, Scattering), (*Electrons, Diffraction), (*X rays, Diffraction), (*Diffraction, Integrals), Approximation (Mathematics), Molecules, Wave functions, Intensity, Japan

Fourier transform techniques are utilized to simplify the two center integrals encountered in the calculation of molecular and x-ray scattering factors in the first Born approximation. It is shown that the two center integrals can be reduced to a single numerical integration from 0 to 1 for a molecule in a fixed or random orientation in space. The many-electron wave function is taken as a product of hydrogen-like orbitals with arbitrary screening parameters. Explicit expressions for certain cases involving 1s, 2s and 2pz orbitals are given. (Author)

AD-632 367 Fld. 20/8
STANFORD UNIV CALIF DEPT OF PHYSICS
PHASE SHIFT ANALYSIS OF H3 (P, P), H3 (P,N) AND HE3 (N,N) REACTIONS,
by W. E. Meyerhof, and J. N. McElearney. 12 Feb 65, 18p. Contract DA-ARO (D)-31-124-G337,
AROD 3269:15
Unclassified report

Availability: Published in Nuclear Physics, v74 p533-50 1965. Copies to DDC users only.

Descriptors: (*Tritium, Proton bombardment), (*Helium, Neutron reactions), (*Proton reactions, Phase shift), (*Neutron reactions, Phase shift), Nuclear cross sections, Statistical distributions, Atomic energy levels, Nuclear energy levels, Excitation, Polarization, Elastic scattering

A least-squares phase shift analysis was made to experimental cross sections and angular distributions of the H3 (p,p), H3 (p,n) and He3 (n,n) reactions up to 1.5 MeV energy in the p+T c.m. system. The energy variation of the phase shifts considered was parametrized as follows: singlet-S by the Breit-Wigner single level formalism triplet-S, singlet P and triplet-P by an effective range approximation of Shaw and Ross. In agreement with earlier work of Werntz, evidence was found for a 0 (+) state in He4, peaking at approximately 20.1 MeV excitation energy and having a total reduced width close to the single particle value. The P wave phase shifts point to a p+T interaction which would appear experimentally as a state in He4 peaking around 22 MeV excitation energy. Recent H3 (p,n) polarization measurements are consistent with a spin 1 (-) for this state. An analysis by Tombrello of the He3 (p,p) reaction supports a tentative conclusion that both the He4 states have T = zero. The present work shows also that the Wigner cusp phenomena in the T (p,p) reaction can be well explained over a wide range of energies by the reaction formalisms used in this analysis. (Author)

AD-632 368 Fld. 20/8
STANFORD UNIV CALIF DEPT OF PHYSICS
STUDY OF THE 13C (3HE,GAMMA-O)16O REACTION IN THE REGION OF THE GIANT DIPOLE RESONANCE,
by N. G. Puttaswamy, and D. Kohler. 25 Oct 65, 3p. Contract DA-ARO (D)-31-124-G337,
AROD 3269:19
Unclassified report

Availability: Published in Physics Letters v20 n5 p288-90 Feb 15, 1966. Copies to DDC users only.

Descriptors: (*Carbon, Particle bombardment), (*Helium, Nuclear reactions), (*Gamma-ray spectra, Carbon), Oxygen, Nuclear energy levels, Nuclear cross sections, Ion beams, Nuclear resonance

The yield of the ground-state gamma-ray in the C13 (He3, gamma ray)O16 reaction was studied for incident He3 energies between 1.0 and 3.5 MeV corresponding to excitation energies in O16 between 23.60 and 25.64 MeV.

AD-632 410 Fld. 20/8
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
ON THE BRUECKNER-GOLDSTONE LINKED CLUSTER EXPANSION FORMULA.
Research translation,
by Wu Shi-shu. Feb 66, 29p. Rept. no. Emm-65-27,
Contract AF 19 (628)-5073,
TT 66-61217
Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n2 p147-58 1964.

Descriptors: (*Nuclear shell models, *Series), Potential theory, Invariance, Nuclear structure, China

It is shown that in the case of one particle outside or one hole inside a closed shell, a linked cluster expansion formally indentical with that for a closed shell with all self-energy diagrams eliminated can be obtained even if there is degeneracy. (Author)

AD-632 417 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
BOSTON COLL CHESTNUT HILL MASS
A NEW DIRAC BISPINOR FORM OF MAXWELL'S EQUATIONS AND ITS ROLE IN A THEORY OF ELEMENTARY INTERACTIONS.
Final rept. Pt 3, 1 Oct 64-1 Apr 65,
by Darryl J. Leiter. 23 Aug 65, 16p. Contract AF 19 (604)-8819, Proj. AF-5620, Task 562003, AFCRL 65-855-Pt-3
Unclassified report

Descriptors: (*Field theory, *Elementary particles), Relativity theory, Partial differential equations, Nuclear spins

Using the relativistic-operational concept of elementary interaction, the author shows that it is possible to write Maxwell's equations in a bi-spinor form similar to that of the bi-spinor Dirac equation. In the context of a theory of elementary interactions, new electromagnetic interactions are introduced in a natural way through the use of the bispinor Maxwell equations in a Lagrangian formalism. In particular a new 'spinor torque' interaction occurs in addition to the usual 'Lorentz Force' interaction. The physical effects of this new electromagnetic interaction in a theory of elementary interactions are discussed. (Author)

AD-632 511 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
STRUCTURE OF THE ALPHA PARTICLE FROM ELASTIC ELECTRON SCATTERING,
by R. F. Frosch, R. E. Rand, K. J. Van Oostrum, and M. R. Yearian. Apr 66, 13p. Rept. no. HEPL-435,
Contract Nonr-225 (67),
Unclassified report

To be submitted to Phys. Rev. Letters.

Descriptors: (*Alpha particles, Nuclear structure), Helium, Electron bombardment, Elastic scattering, Nuclear cross sections, Statistical distributions, Momentum

Using a liquid helium target a study was made of elastic electron scattering from He4 at values of q sq., the 4-momentum transfer squared, ranging from 0.5 F to the -2 power to 10.0 F to the -2 power. The results were interpreted in terms of the charge form factor of the alpha particle. Previous Stanford measurements extended up to q sq = 6.2 F to the -2 power and were consistent with a Gaussian charge distribution. The form factor values obtained recently by Repellin et al, at Orsay from a measurement of relative cross sections up to q sq. = 8 F to the -2 power indicated a deviation both from the earlier Stanford data and from the Gaussian model. The results confirm the original Stanford data but do show a deviation from the Gaussian model for q sq > 6 F to the -2 power. The qualitative trend of the deviation is the same as observed by Repellin et al, whereas the absolute form factor values are in disagreement. Among the models which have been found to fit the new data are the Modified Gaussian charge distribution, and the independent particle model using a finite square well. (Author)

AD-632 543 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
CHARGED PION YIELDS FROM E (-) + P REACTIONS,
by S. P. Berezin, P.C. Gugelot, and P. Heide.
Feb 66, 19p. Rept. no. HEPL-424,
Contract Nonr-225 (67),
Unclassified report

Presented at the International Symposium on Electron and Photon Interactions at High Energies, Hamburg (Germany), 8-12 Jun 65.

Descriptors: (*Pions, Nuclear cross sections), (*Beta-particle reactions, Pions), (*Proton reactions, Pions), Electrons, Photonuclear reactions, Bremsstrahlung, Photons

Charged pion yields from the reactions e (-)p to e (-)n pion (+) and e (-)p to e (-)p pion (+) pion (-) were measured in the region of the N* resonance. It is shown that for the single pion reaction the cross section can be understood in terms of a virtual photon which is almost transverse and can be fit by a virtual bremsstrahlung spectrum plus photoproduction results. (Author)

AD-632 578 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF PHYSICS
ANALYSIS OF THE REACTION (NEGATIVE-PION + PROTON TO ETA-BARYON + NEUTRON) NEAR THRESHOLD,
by F. Uchiyama-Campbell, and R. K. Logan.
1966, 19p. Contract Nonr-1834 (05),
Unclassified report

Descriptors: (*Baryons, Nuclear cross sections), (*Meson reactions, Analysis), (*Proton reactions, Analysis), (*Pions, Nuclear reactions), Neutrons, Resonance, Field theory, Phase shift, Nuclear scattering

Analysis was made of the more recent data concerning the reaction pi (-) + p to eta + n, fitting both the total and differential cross sections. Because of the large disparities between the various phase shift solutions it was felt that fitting the reaction and elastic data simultaneously might prove misleading. The reaction data was therefor handled independently of the phase shift analyses. It was possible to explain the enhancement of the total eta production cross section in terms of a two channel S-wave Breit-Wigner resonance. The angular distribution was fitted by adding small amounts of P and D wave to the dominant S-wave term. A successful two channel effective range fit to the data was also performed yielding results similar to the Breit-Wigner fit.

AD-632 579 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF PHYSICS
MOSSBAUER SCATTERING IN PT195 I,
by M. Atac, P. Debrunner, and H. Frauenfelder.
1966, 15p. Contract Nonr-1834 (05),
Unclassified report

Descriptors: (*Platinum, *Mossbauer effect), Radioactive decay, Gamma emission, Backscattering, Nuclear energy levels, Iron, Cobalt, Nickel, Nuclear scattering, Doppler effect, Nuclear spectroscopy

The Mossbauer effect of the 99 keV transition in Pt195 was studied in a backscattering geometry. From the partially resolved Zeeman pattern observed with platinum in iron, cobalt and nickel, the g-factor of the excited state, g3/2 = - 0.43 + 0.10, and the internal fields were determined. (Author)

AD-631 954 **See Fld. 18/8**

AD-632 014 **See Fld. 20/6**

AD-632 242 **See Fld. 18/8**

AD-632 373 **See Fld. 20/10**

AD-632 374 **See Fld. 20/10**

AD-632 414 **See Fld. 20/10**

AD-632 534 **See Fld. 18/11**

AD-632 577 **See Fld. 14/2**

20/9. PLASMA PHYSICS

AD-631 843 Fld. 20/9, 20/14
CFSTI Prices: HC $1.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) MICROWAVE DEPT
VARIATION OF ELECTRON DENSITY AND NEUTRAL GAS DENSITY ALONG A PLASMA COLUMN.
Scientific rept. no. 1, 1 Jun-31 Aug 65,
by Ake Nord. 15 Jan 66, 15p. Contract AF 61 (052)-895,
RADC TR-66-186
Unclassified report

Descriptors: (*Plasma medium, Density), Electrons, Gases, Density, Microwave spectroscopy, Cavity resonators, Attenuation, Line spectrum, Discharge tubes, Sweden

The axial variation of the electron density and the neutral gas density along a mercury plasma column were measured. The electron density was determined from measurements of the shift of the resonance frequency of a cylindrical microwave cavity operating in the TM sub 010-mode. From measurement of the attenuation of mercury resonance line radiation at 2537A the neutral gas density was determined. Both the electron and the neutral gas densities were found to increase towards the anode. (Author)

AD-631 844 Fld. 20/9, 20/14
CFSTI Prices: HC $1.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) MICROWAVE DEPT
COUPLING OF WAVES IN A HOT INHOMOGENEOUS ANISOTROPIC ELECTRON PLASMA.
Scientific rept. no. 2, 1 Jun 65-30 Nov 65,
by K. E. Lonngren, A. Sjolund, and P. Weissglas.
20 Jan 66, 19p. Contract AF 61 (052)-895,
RADC TR-66-187
Unclassified report

Descriptors: (*Plasma oscillations, Propagation), Electrons, Vector analysis, Magnetic fields, Density, Wave transmission, Sweden

The coupling of waves in a region of varying density in a hot anisotropic electron plasma is studied theoretically. The influence of the width of the inhomogeneous region and of the angle between the propagation vector and the static magnetic field are investigated. The latter parameter is shown to be very important. (Author)

AD-631 846 Fld. 20/9, 20/14
CFSTI Prices: HC $1.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) MICROWAVE DEPT
EXPERIMENTS ON ION-ACOUSTIC WAVES.
Rept. for 1 Jun 65-15 Jan 66,
by P. O. Nilsson. 25 Jan 66, 13p. Rept. no. Scientific-4,
Contract AF 61 (052)-895,
RADC TR-66-189
Unclassified report

Descriptors: (*Plasma oscillations, Propagation), Ions, Acoustics, Gas discharges, Microwaves, Excitation, Sweden

Propagation of ion-acoustic waves was observed in the positive column of a low pressure mercury discharge. Both self-excited and externally excited waves were shown to exist in the frequency range 50 - 120 kHz. The waves were approximately unattenuated. The experimental dispersion relation is compared with theory. (Author)

AD-631 859 Fld. 20/9, 20/3, 20/4
CFSTI Prices: HC $6.00 MF $1.50
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
RESEARCH ON ELECTROMAGNETICS FOR PROJECT DEFENDER.
Semi-annual technical summary for 31 Mar 66,
by Rudolf G. E. Hutter. 31 Mar 66, 298p. Rept. no. PIBMRI-1295.2-66,
Contract Nonr-839 (38) ,ARPA Order-529
Unclassified report

See also AD-623 718.

Descriptors: (*Plasma physics, Scientific research), (*Electromagnetic waves, Electronics), (*Fluid mechanics, Scientific research), Ablation, Films, Semiconductors, Radiation damage, Plasma medium, Electron beams, Plasma sheath, Cerenkov radiation, Shock waves, Kinetic theory

Progress on a fairly large number of projects is described in the semiannual report. With one exception, these projects can be grouped into four categories: plasma, electromagnetics, fluid dynamics and ablation studies. The general theme of nearly all projects in the first three groups is the concern with the electromagnetic properties of ionized gases and/or plasmas, such as the properties of antennas, excitation of waves in plasmas, propagation through plasmas, measurement of electron densities of shock waves, precursor studies of shocks, instabilities in plasmas, properties of laboratory plasmas. One contribution is concerned with the basic kinetic theory of ionized media. A few others are concerned with gas flow problems. The work on ablation was just incorporated in the program, and one contribution deals with this subject. (Author)

AD-631 992 Fld. 20/9, 7/4
CFSTI Prices: HC $6.00 MF $1.50
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
STATISTICAL MECHANICAL THEORY OF DENSE PLASMAS.
Scientific rept. for 1 Jul 64-30 Jun 65 (Interim),
by Guido Sandri, Roger D. Sullivan, Arnold Kritz, and Frederick Schatzmann. Jan 66, 283p. Rept. no. ARAP-74,
Contract AF 33 (615)-1910, Proj. AF-7073, ARL 66-0009

Unclassified report

Descriptors: (*Statistical mechanics, *Plasma physics), Theory, Density, Kinetic theory, N-body problem, Statistical functions

The physical and mathematical tools are developed for the analysis of the behavior of plasmas for which the given Bogolubov conditions do not hold. The higher order terms in these conditions for all observable quantities depend on three- and four-body correlations. The authors show that a direct calculation with Bogolubov's technique leads to divergent results. They introduce a method believed to be a far-reaching generalization of Bogolubov's. The emphasis of the classical analysis, in terms of sharply localized particle collisions, is shifted by the method to an analysis of the time scales on which the phenomena evolve. This shift leads to a new view of kinetic equations. An analysis is given of the three-body correlations which relies on the solution of the three-body problem for hard spheres. They also obtain in closed form the nth order term in the Bogolubov expansion. They then introduce an externally controlled test particle in order to probe into the properties of these correlations and to develop rigorously the corresponding statistical theory. As an application of their theory, they obtain the complete solution for the lowest order distribution function in one dimension which coincides exactly with the nonlinear Debye-Huckel theory. Next they prove that three-body correlations appear one order sooner than when the test particle is absent. The transition to the macroscopic (or 'fluid') description is carried out by an appropriate expansion, and the transient behavior is given of the important moments. Finally, correlation functions among many particles are discussed. (Author)

AD-631 993 Fld. 20/9, 20/5
CFSTI Prices: HC $3.00 MF $0.75
TEXAS UNIV AUSTIN
RESEARCH ON PLASMA DIAGNOSTIC METHODS FOR HIGH TEMPERATURE PLASMA RESEARCH.
Quarterly rept. no. 9, 1 Apr-30 Jun 65,
by Arwin A. Dougal, R. F. Gribble, M. O. Hagler, , D. J. Mayhall, and H. N. Roberts. Dec 65, 78p.
Contract AF 33 (615)3124, Proj. 7073, ARL 65-270

Unclassified report

See also AD-432 170.

Descriptors: (*Plasma medium, High-temperature research), (*Masers, Infrared radiation), (*Magnetic pinch, Analysis), Interferometers, Electrons, Density, Helium, Neon, Deuterium, Magnetic fields, Polarization, Lasers, Plasma sheath, Microwaves

Investigations on the utilization of a He-Ne 3.39 micron infrared maser for experimental time-space resolved diagnostics of highly transient, extreme temperature, deuterium plasmas are reported. The infrared maser coupled resonator technique for measurement of electron density was extended such that useful data were obtained for a theta-pinch plasma source operating at 50 Kg compression with 4 and 6 Kg reverse bias magnetic fields at 0.1 Torr initial pressure. Measurement of the magnetoplasma Faraday rotation of the plane of polarization of the He-Ne maser infrared radiation by the use of an infrared polarization analyzer was extended and uncertainties in the measurements were reduced. The determination of electron density provided further information for obtaining time-space resolved plasma magnetic fields from the Faraday rotation data. Resonant operation permits investigation of the low density plasma sheaths surrounding the dense core of the theta-pinch. An equation for the efficiency of a plane echelette diffraction grating is developed from the vector Kirchoff integral equation for the electric field by making an approximation for the electric and magnetic fields at the surface of the grating.

AD-632 125 Fld. 20/9
CFSTI Prices: HC $1.10 MF $0.50
HARRY DIAMOND LABS WASHINGTON DC
AN EQUATION FOR PHASE VELOCITIES IN A PARTIALLY IONIZED GAS,
by H. D. Curchack, and F. T. Harris. Feb 66, 25p. Rept. no. TR-1316,
Proj. DA-1P523801A301 ,HDL-36500

Unclassified report

Descriptors: (*Magnetohydrodynamics, *Equations of motion), (*Plasma physics, Phase studies), Gas ionization, Vector analysis, Differential equations

This report extends previous work on a fully ionized gas by including the effects of neutral particles. Proper manipulation of the equations yields a homogeneous linear differential equation for the vector conduction current density. By choosing the conduction current density of the form e (iw (t-y/v)), the magnetic field in the x-y plane, and by setting the determinant of the coefficients in the homogeneous scalar conduction current density equations equal to zero, an expression is obtained relating many phase velocities to the properties of the plasma. This report shows the mathematical derivation of the determinant. (Author)

AD-632 183 Fld. 20/9
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF
PHYSICAL PROPERTY DISTRIBUTIONS IN A LOW -PRESSURE CROSSED-FIELD PLASMA ACCELERATOR.
Revised ed.,
by Donald P. Duclos, Y. C. Lin Wu, M. Richard-Denison, and Richard W. Ziemer. 14 Jun 65, 9p.
Contract AF 49 (638)-1063, Proj. AF-9752, Task 975201,
AFOSR 66-0358

Unclassified report

Revision of manuscript submitted 29 Jan 65.

Availability: Published in AIAA Journal v3 n11 p2026-32 Nov 1965. Copies to DDC users only.

Descriptors: (*Cssed field devices, Plasma accelerators), (*Plasma accelerators, Physical properties), Experimental data

The physical phenomena that occur in a steady crossed -field accelerator were studied both experimentally and analytically. Experiments were conducted on a crossed -field accelerator of conventional design employing a single electrode pair and operated with argon at a channel static pressure of about 1-mm Hg and a magnetic field of up to 5000 gauss. Measurements of the current distribution over the anode and cathode surfaces and the potential and electron temperature distributions between the anode and cathod were obtained. An approximate theoretical analysis of the accelerator was developed which accounts for Hall effects, ion slip, viscosity, and elevated electron temperature. From this analysis, the potential current density, and electron and atom temperature distributions were calculated. The calculations agreed reasonably well with the measurements except in the region near the electrode surfaces. As expected, at large values of the Hall parameter, the current distribution was found to be unsuitable for producing a high accelerator efficiency. (Author)

AD-632 318 Fld. 20/9, 20/14
CFSTI Prices: HC $1.00 MF $0.50
RCA VICTOR CO LTD MONTREAL (QUE BEC) RESEARCH LABS
LINEARLY POLARIZED WAVES IN PLASMAS IN THE REGION OF THE ELECTRON CYCLOTRON FREQUENCY.
Research rept.,
by Morrel P. Bachynski, and Brian W. Gibbs. Jan 66, 26p. Rept. no. Scientific-3,RR-7-801-4
Contract AF 19 (628)-4071, Proj. AF-4642, Task 464202,
AFCRL 66-137

Unclassified report

Descriptors: (*Plasma medium, Electromagnetic waves), (*Electromagnetic waves, Propagation), Helium, Polarization, Cyclotron resonance phenomena, Magnetic fields, Electric fields, Canada, Glow discharges

Linearly polarized incident electromagnetic waves were propagated along the direction of a static magnetic field through a helium afterglow plasma in the frequency region of the electron cyclotron frequency. The experimental measurements illustrate clearly the behavior of the two transverse wave modes that the plasma can support. At high electron densities the right-hand circularly polarized component is completely attenuated and the variation of the transmitted signal is due entirely to the left-hand circularly polarized component. Alternately at low electron densities the plasma is transparent to the left-hand mode and the variation in transmitted signal is due to the righthand mode. Detailed comparisons of measurements of the phase and intensity of the components of the electric field transmitted through the plasma in the same orientation as the incident polarization and cross-polarized to the incident polarization show good agreement with theory. (Author)

AD-632 352 Fld. 20/9, 7/4
CFSTI Prices: HC $4.00 MF $1.00
RCA VICTOR CO LTD MONTREAL (QUE BEC) RESEARCH LABS
ELECTROCHEMICAL PROPERTIES OF SEEDED PLASMA FLOW FIELDS II.
Final technical summary rept. 1 Dec 64-31 May 65,
by A. I. Carswell, C. Richard, and A. K. Ghosh. Jun 65, 140p. Rept. no. RR-7-801-39,
Contract Nonr-4596 (00),Order-665

Unclassified report

Descriptors: (*Plasma medium, Electrochemistry), (*Glow discharges, Quenching (Inhibition)), Oxygen, Sulfur compounds, Fluorides, Water vapor, Nitrogen compounds, Carbon dioxide, Oxides, Ionization, Nitrogen, Gas flow, Canada

The effectiveness of various electronegative gases (O2, CO2, NO, SF6, H2O), as a means of reducing the ionization in plasma flow fields (nitrogen plasma) are experimentally investigated and compared. In the thermal condition prevailing, SF6 and water vapor are found to be the most effective in quenching the plasma. Electrostatic probe, optical emission spectroscopy, thermocouple and NO titration techniques are employed to monitor the plasma properties. The complex nature of the short duration pink afterglow in nitrogen is studied in some detail both in flowing and non-flowing systems in order to ascertain more quantitatively the effectiveness of the different quenching gases. The effects of gas pressure, wall condition and gas purity on the afterglow behaviour are closely examined in view of the reproducibility of measurements. A theoretical study of the limitations and applicability of electrostatic probe methods to plasmas containing negative ions is made and computations of characteristics are presented. Results of measurements of the flow velocity by different techniques are compared and the importance of an accurate determination of plasma flow field velocity is discussed. (Author)

AD-632 379 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
GIANNINI SCIENTIFIC CORP SANTA ANA CALIF
TOROIDAL PLASMA CONTAINMENT WITH ROTATING MAGNETIC FIELD.
Final rept.,
by D. E. Brown, and H. G. Loos. Apr 66, 49p.
Rept. no. FR-046-1539,
Contract AF 49 (638)-1539,
AFOSR 66-0778

Unclassified report

Descriptors: (*Plasma medium, *Magnetic fields), Rotation, Bodies of revolution, Discharge tubes, Containment, Control systems, Argon

Experimental investigations were conducted on a toroidal plasma with alternating pinch- and theta-pinch magnetic fields as well as with a theta-pinch and with a screw pinch. For the alternating pinch, the resultant magnetic vector is rotating, so that there are no periodic zeros in the containing magnetic pressure, and containment times for high-plasmas may possibly be extended beyond one half cycle. Also, for field rotation frequencies much smaller than the electron collision frequency, shear occurs in the magnetic field through the skin of the plasma, thereby improving the plasma stability. If the current sheet thickness measured from the oscillograms is taken as skin depth, Suydam's necessary condition for stability of a linear pinch with a rotating magnetic field is not satisfied in our experiments. The 'fanning' effect occurring right after the plasma compression in the second half cycle in toroidal theta-pinches is quenched by the rotating field, but plasma conditions for the theta-pinch and for the alternating pinch are not comparable on account of the inhibiting effect of the pinch magnetic field on the ionization caused by the theta-pinch field. (Author)

AD-632 422 Fld. 20/9, 20/13
CFSTI Prices: HC $1.00 MF $0.50
DARTMOUTH COLL HANOVER N H
A TWO-TEMPERATURE THEORY FOR A HELIUM ARC PLASMA IN A CYLINDRICAL DUCT,
by Agnar Pytte, and Niels K. Winsor. 1965, 15p.
Contract AF 33 (657)-8179,
ARL 66-0047

Unclassified report

Descriptors: (*Plasma medium, Thermodynamics), (*Electrons, Transport properties), (*Heat transfer, Plasma medium), (*Helium, Plasma medium), Electric arcs, Cylindrical bodies, Ducts, Mathematical analysis

A simple theoretical model with different electron and heavy particle temperatures is applied to a high pressure helium arc in a cooled cylindrical duct. Single temperature theories predict a universal curve independent of duct radius for dissipated power versus the product of the axial electric field and the duct radius. The experimentally measured deviations from this universal curve are explained by the two temperature theory. The current-voltage characteristic of a cylindrical wall segment probe is also understood in terms of an elevated electron temperature, often exceeding the heavy particle temperature by an order of magnitude near the wall. (Author)

AD-632 470 Fld. 20/9
CALIFORNIA INST OF TECH PASADENA
ON THE THEORY OF PULSE STIMULATED RADIATION FROM A PLASMA.
Technical rept.,
by Wilhelm H. Kegel, and Roy W. Gould. 12 Nov 65, 6p. Rept. no. TR-30,
Contract Nonr-220 (50),

Unclassified report

Availability: Published in Physics letters v19 n7 p531-2 Dec 15 1965. Copies to DDC users only.

Descriptors: (*Plasma medium, *Cyclotron resonance phenomena), Magnetic fields, Electrons, Relativity theory

By including the relativistic mass change in the motion of electrons gyrating in a slightly inhomogeneous field, it is possible to account for the cyclotron echoes observed by Hill and Kaplan (Phys. Rev. Letters v14 p1062 1965). (Author)

AD-632 541 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) MICROWAVE DEPT
NUMERICAL CALCULATIONS OF FIELDS AND DISPERSION CURVES FOR A HOT, INHOMOGENEOUS CYLINDRICAL PLASMA.
Scientific rept. no. 5, 1 Jun 65-15 Jan 66,
by L. Sjogren. 25 Jan 66, 25p. Contract AF 61 (052)-895,
RADC TR-66-304

Unclassified report

See also AD-631 844.

Descriptors: (*Plasma physics, *Electric fields), (*Numerical analysis, Electric fields), Graphics, Cylindrical bodies, Sweden, Field theory

A method for the numerical solution of the system of differential equations describing the electric field in a cylindrical plasma surrounded by a metal shield, has been developed. The plasma is hot, inhomogeneous and situated in a constant magnetic field. The method has been applied to a case with wave propagation and magnetic field both parallel to the axis of the cylinder. Numerical solutions for the inhomogeneous plasma have, as yet, been obtained only for test purposes, as the program construction has just been completed. A preliminary study of the plasma with constant electron density has been made for the mode which has axial symmetry. (Author)

AD-632 056 **See Fld. 20/5**

AD-632 100 **See Fld. 20/5**

AD-632 140 **See Fld. 9/5**

AD-632 164 **See Fld. 20/3**

AD-632 166 **See Fld. 3/2**

AD-632 171 **See Fld. 3/2**

AD-632 207 **See Fld. 14/2**

AD-632 228 **See Fld. 19/4**

AD-632 257 **See Fld. 20/4**

AD-632 266 **See Fld. 4/1**

AD-632 321 **See Fld. 20/4**

AD-632 344 **See Fld. 17/9**

AD-632 425 **See Fld. 9/3**

AD-632 565 **See Fld. 4/1**

20/10. QUANTUM THEORY

AD-632 373 Fld. 20/10, 20/8, 12/1
DUKE UNIV DURHAM N C DEPT OF PHYSICS
INTRINSIC SUPERSELECTION RULES OF ALGEBRAIC HILBERT SPACE,
by L. P. Horwitz, and L. C. Biedenharn. 4 Mar 65, 24p. Contract DA-ARO (D)-31-124-G604,
AROD 3233:29

Unclassified report

Prepared in cooperation with European Council for Nuclear Research, Geneva (Switzerland).

Availability: Published in Helvetica Physica uacta v38 n4 p385-408 1965. Copies to DDC users only.

Descriptors: (*Selection rules, Functional analysis), (*Functional analysis, *Quantum mechanics), (*Mathematical logic, Quantum mechanics), Algebras, Switzerland

The structure of a quantum theory described by a Hilbert space over an arbitrary finite algebra with unity quantity is studied. It is found that such a quantum theory, in which the observables are linear with respect to the quantities of the algebra, is isomorphic to a quantum theory described by a Hilbert space over a field in which there are superselection rules. Gleason's theorem is shown to be applicable; the linear manifolds generated by the minimal ideals of the algebra give rise to the pure states. The minimal ideals therefore play a role analogous to the phases in a complex Hilbert space. Illustrations are given for the complex, quaternion and Cayley algebras. (Author)

AD-632 374 Fld. 20/10, 20/8
DUKE UNIV DURHAM N C DEPT OF PHYSICS
ON THE REPRESENTATIONS OF THE SEMI-SIMPLE LIE GROUPS. V. SOME EXPLICIT WIGNER OPERATORS FOR SU3,
by G. E. Baird, and L. C. Biedenharn. 1 Feb 65, 9p. Contract DA-ARO (D)-31-124-G604,
AROD 3233:31

Unclassified report

Prepared in cooperation with Northrop Space Labs., Huntsville, Ala. See also N63-23752, AD-613 415.

Availability: Published in Journal of Mathematical Physics v6 n12 p1847-54 Dec 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, *Groups (Mathematics)), (*Operators (Mathematics), Elementary particles), Tensor analysis, Matrix algebra, Vector analysis

A general method for the calculation of the (21 ... 10) Wigner operators is presented and used to obtain specific results for the SU3 group. General expressions for the SU3 reduced Wigner operators are given for tensor operators transforming like the representations (100), (110), and (210). (Author)

AD-632 375 Fld. 20/10
DUKE UNIV DURHAM N C DEPT OF PHYSICS
ON THE UNITARY REPRESENTATIONS OF SU (1, 1) AND SU (2, 1),
by L. C. Biedenharn, J. Nuyts, and N. Straumann. 11 May 65, 27p. Contract DA-ARO (D)-31-124-G604,
AROD 3233:30

Unclassified report

Availability: Published in Ann. Inst. Henri Poincare v3 n1 p13-39 1965. Copies to DDC users only.

Descriptors: (*Quantum mechanics, Elementary particles), Groups (Mathematics), Mathematical models, Wave functions, Set theory, Switzerland

The paper is concerned with the explicit construction of all unitary representations of the two non-compact groups SU (1, 1) and SU (2, 1) as ancillary to the study of the family of groups SU (p, q). (Author)

AD-632 414 Fld. 20/10, 7/4, 20/8
CFSTI Prices: HC $2.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
METHOD OF FIELD-THEORETIC GREEN'S FUNCTIONS IN ATOMIC AND MOLECULAR PROBLEMS.

Research translation,
by V. V. Tolmachev. Apr 66, 37p. Rept. no. T-R-546,
Contract AF 19(628)-3880,
TT 66-61220

Unclassified report

Metod Polevykh Funktsii Grina v Atomnykh i Molekuliarnykh Zadachakh, trans. of Lietuvos Fizikos Rinkinys (Lithuanian SSR) v3 n1/2 p47-72 1963.

Descriptors: (*Field theory, *N-body problem), (*Green's function, N-body problem), Perturbation theory, Electrons, Atoms, Molecules, USSR

The concepts and methods of the quantum field theory are applied to the many-electron problem in atoms and molecules. The field-theoretic formulation of perturbation theory is developed in these problems with respect to the smallness of the mutual interaction of the electrons and rules are given for composing the corresponding Feynman diagrams and the contributions from them. A comparison is made in the first and second orders between the field-theoretic and conventional forms of the perturbation theory. Two systems of exact field equations are formulated: one system of field equations, the Dyson-Schwinger, for study of the one-particle corpuscular aspect of the problem, and another, new system of field equations for study of the two-particle corpuscular aspect of the problem. (Author)

AD-632 437 Fld. 20/10, 7/4
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
APPROXIMATION OF THE EXCHANGE OPERATOR FOR A SYSTEM OF ELECTRONS,
by Herbert Payne. 15 Jul 65, 4p. Rept. no. ARL-66-0045,

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n10 p3772-3 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Wave functions, *Electrons), Operators (Mathematics), Approximation (Mathematics), Hartree-Fock approximation

AD-632 444 Fld. 20/10, 7/4, 3/2
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
DECAY THEORY OF CLOSELY COUPLED UNSTABLE STATES,
by Lyman Mower. 13 Oct 65, 18p. Contract DA-ARO (D)-31-124-G422,
AROD 3888:1

Unclassified report

Availability: Published in Physical Review v142 n4 p799-816 Feb 25 1966. Copies to DDC users.

Descriptors: (*Atomic energy levels, Theory), Electron transitions, Green's function, Operators (Mathematics), Quantum mechanics, Probability, Hydrogen, Spectroscopy, Matrix algebra, Photons, Radiofrequency

A treatment of decay theory is presented which generalizes existing treatments so as to apply to closely coupled unstable states. The treatment is based upon a Green's function formulation for the transition amplitude in which the states of interest are selected by suitable projection operators. As an indication of the practicality of the resulting formulation a number of examples are given involving the stimulated transition between closely coupled unstable states. (Author)

AD-632 449 Fld. 20/10
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS
GENERALIZATION OF THE PROBABILITY CURRENT DENSITY IN QUANTUM MECHANICS,
by Marius Kolsrud. May 56, 13p. Rept. no. 33, Contract AF-EOAR-32-64, AFOSR 66-0699

Unclassified report

Presented at the Meeting of Norsk Fysisk Selskap, May 56; and pub. in the Proceedings of the Physics Seminar in Trondheim Apr 55/56.

Availability: Published in Physica Mathematica. Copies to DDC users only.

Descriptors: (*Quantum mechanics, *Statistical functions), Hamiltonian, Probability, Norway

AD-631 938 **See Fld. 3/2**

AD-632 038 **See Fld. 7/4**

AD-632 109 **See Fld. 20/5**

AD-632 226 **See Fld. 7/4**

AD-632 404 **See Fld. 20/12**

AD-632 419 **See Fld. 20/6**

20/11. SOLID MECHANICS

AD-631 939 Fld. 20/11
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
TRANSVERSALLY ISOTROPIC CYLINDERS UNDER BAND LOADS.
Research rept.,
by Howard S. Levine, and Jerome M. Klosner. Jan 66, 34p. Rept. no. PIBAL-908,
Contract Nonr-839 (40)FBM, Proj. NR-064-427,

Unclassified report

Descriptors: (*Loading (Mechanics), *Structural shells), Cylindrical bodies, Elasticity

The problem of a transversally isotropic circular cylindrical shell subjected to periodically spaced, axisymmetric band loads is investigated. The three-dimensional elasticity solution is obtained and stresses and displacements are evaluated for values of the modulus ratio equal to two, five and ten. Also presented are expressions for the stresses and displacements obtained by use of a thin orthotropic shell theory. The results are compared to determine the effects of a change in modulus ratio on the stresses and displacements of the cylinder and the accuracy of the shell theory. A detailed analysis of the data is carried out for a ratio of inner to outer shell radii equal to 0.70, a ratio of distance between band loads to outer shell diameter equal to 0.2., and a ratio of band width to distance between band loads of 0.2. (Author)

AD-631 988 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.75
FLORIDA UNIV GAINESVILLE DEPT OF ENGINEERING SCIENCE AND MECHANICS
NONLINEAR RESPONSE OF A THIN CONICAL SHELL TO DYNAMICALLY APPLIED AXIAL FORCE.
Technical rept.,
by John A. Wilder. Mar 66, 70p. Contract DA-ARO-D-31-124-G372, Proj. DA-20014501B33G,
AROD 3368:3

Unclassified report

Descriptors: (*Structural shells, Deflection), Conical bodies, Dynamics, Force (Mechanics), Numerical analysis, Nonlinear differential equations

The response of a truncated conical shell to a dynamic axial force is studied by means of a large deflection analysis which includes the concept of initial imperfections. The derived governing nonlinear partial differential equations are reduced to nonlinear ordinary differential equations of a lower-order by a first-approximation and the Galerkin method. For cones of moderate length, the solutions are found to be dependent on one physical and three geometric parameters. Numerical solutions to these equations are obtained by the Runge-Kutta algorithm and studies conducted to determine the effect of varying the pertinent parameters. It is found that the value of the load parameter in the region of instability and the number of longitudinal waves increase significantly for increased rates of loading. The results of varying the geometric parameters are in agreement with trends indicated in experimental data, but not predicted by previous theoretical analyses. (Author)

AD-632 002 Fld. 20/11
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y
EXPLICIT FORMS OF THE MATERIAL FUNCTIONS FOR CERTAIN NON-LINEAR MATERIALS WITH MEMORY.
Research rept.,
by T. Tang Wang. Feb 66, 41p. Rept. no. PIBAL-912,
Contract Nonr-839 (32) (FBM), Proj. NR-064-457,

Unclassified report

Descriptors: (*Viscoelasticity, Aging (Materials)), (*Functional analysis, Viscoelasticity), Mechanical properties, Nonlinear systems, Integrals, Materials

The explicit restrictions on the forms of the kernels (material functions) in Green and Rivlin's integral representation of the tensor-valued constitutive functionals are studied for certain classes of materials, namely, materials with no ageing effects, materials which exhibit no creep recoveries, and materials whose deformations are completely recoverable upon complete unloading. The results may be helpful in the experimental characterization of the non-linear viscoelastic materials. It is shown that for materials which do not exhibit ageing effects the variables in each of the kernels should appear as the difference between the present and the past time variables. For materials with no creep recoveries the present time variable in the kernels of the creep integral laws must vanish. Finally, it is shown that for completely recoverable materials, if the limit of each kernel in the creep integral laws exists as the present time variable tends to infinity, then the limit should vanish identically. Procedures for experimental determination of the kernels for each class of materials are also discussed. (Author)

AD-632 037 Fld. 20/11
UNITED AIRCRAFT CORP EAST HARTFORD CONN
THERMALLY INDUCED VIBRATIONS OF THIN NONSHALLOW SPHERICAL SHELLS.
Revised ed.,
by H. Kraus. 22 Nov 65, 6p. Contract DA-31-124-ARO (D)-146,
AROD 4367:4

Unclassified report

Presented at the AIAA Annual Meeting (2d), San Francisco, Calif., Jul 26-29, 1965.

Availability: Published in AIAA Journal v4 n3 p500-5 Mar 1966. Copies to DDC users only.

Descriptors: (*Structural shells, Vibration), (*Spheres, Vibration), (*Vibration, Thermal stresses), Thickness, Bodies of revolution, Guided missiles, Oscillation, Thermal insulation, Mathematical analysis, Beams (Structural)

In the thermal stress analysis of rapidly heated structures, it is conventional to ignore the inertia of the body and to treat time as a parameter from

the transient temperature distribution. Recent studies have shown that the retention of the inertia terms in thermal stress analyses of beams and plates leads to solutions that display thermally induced vibrations. Because of the shell-like nature of missile and space vehicle structures, it is of interest to investigate the possibility of such oscillations for the case of a thin shell of revolution. As an example of this, one considers the response of a simply supported nonshallow spherical shell segment, whose inside surface is insulated to a heat flux applied suddenly to its outer surface. The problem is solved by use of a modal expansion procedure and results are given for a range of the parameters that are relevant to the transient behavior of the shell. The results indicate that thermally induced vibrations can, indeed, occur in spherical shells. (Author)

AD-632 210 Fld. 20/11, 11/6
POULTER LABS STANFORD RESEARCH INST MENLO PARK CALIF
CIRCULAR PLATE UNDER A UNIFORMLY DISTRIBUTED IMPULSE,
by A. L. Florence. 1 Jun 65, 13p. Contract AF 29(601)-4329,

Unclassified report

Availability: Published in Int. J. Solids Structures v2 p37-47 1966. Copies to DDC users only.

Descriptors: (*Metal plates, *Loading (Mechanics)), Deformation, Experimental data, Aluminum alloys, Steel

Experiments are described in which simply supported circular plates are subjected to uniformly distributed impulses and the permanent deformations obtained are compared with those predicted by the bending theory of rigid-plastic plates. As opposed to the behavior of beams it is found that agreement between theory and experiment deteriorates as the impulse increases beyond a certain value especially when the predicted permanent central deflection is greater than about one-quarter of the plate radius. This illustrates the appreciable strengthening of plates due to membrane forces not taken into account in the theory. (Author)

AD-632 221 Fld. 20/11
UNIVERSITY COLL CORK (EIRE)
THE LAMBDA-METHOD FOR AEOLOTROPIC RECTANGULAR AND SKEW PLATES,
by Patrick M. Quinlan. 13 Mar 64, 39p. Contract AF-EOAR-61-4,

Unclassified report

See also AD-631 770.

Availability: Published in Proceedings of the Royal Irish Academy v64 SectA n4 p49-84 Mar 1965. Copies to DDC users only.

Descriptors: (*Metal plates, Loading (Mechanics)), Sheets, Rectangular bodies, Boundary value problems, Ireland

AD-632 288 Fld. 20/11
NORTHWESTERN UNIV EVANSTON ILL
A NOTE ON SHEAR AND COMBINED LOADING FOR A PENNY-SHAPED CRACK,
by L. M. Keer. 17 Jul 65, 7p. Contract DA-31-124-ARO (D)-369,
AROD 5527:3

Unclassified report

Availability: Published in Journal of the Mechanics and Physics of Solids v14 p1-6 1966. Copies to DDC users only.

Descriptors: (*Fracture (Mechanics), *Stresses), Shear stresses, Loading (Mechanics), Elasticity, Functions, Integral equations, Boundary value problems

The solution to the problem of a penny-shaped crack under conditions of shear loading is solved when the displacements are prescribed on the face of the crack. The special case of uni-directional shear is discussed. A Griffith's criterion for combined stresses is considered similar to that of Mossakovskii and Rybka. (Author)

AD-632 381 Fld. 20/11, 11/2
CALIFORNIA UNIV BERKELEY DEPT OF CIVIL ENGINEERING
ON AGEING VISCOELASTIC MATERIALS,
by J. Lubliner, and J. L. Sackman. 3 Sep 65, 9p. Contract DA-ARO (D)-31-124-G257,
AROD 4547:8

Unclassified report

Availability: Published in Journal of the Mechanics and Physics of Solids, v14 p25-32 1966. Copies to DDC users only.

Descriptors: (*Viscoelasticity, Aging (Materials), Creep, Differential equations, Concrete, Linear systems, Nonlinear systems, Mathematical analysis, Stresses

CONSTITUTIVE equations for ageing viscoelastic materials are formulated as differential equations with variable coefficients. Particular attention is devoted to the second order equation; the creep function is derived and asymptotic behaviour is studied. Comparison is made with commonly accepted expressions for creep functions of concrete. Extension to nonlinear behaviour is discussed. (Author)

AD-632 385 Fld. 20/11
CATHOLIC UNIV OF AMERICA WASHINGTON D C
VISUAL REPRESENTATION OF THE KINEMATICS OF THE CONTINUUM,
by August J. Durelli. 1965, 27p. Contract DA-ARO (D)-31-124-G394,
AROD 3176:2

Unclassified report

Presented at SESA International Congress on Experimental Mechanics (2nd) Washington, D. C. 28 Sep-1 Oct 1965.

Availability: Published in Experimental Mechanics p1-27 Mar 1966. Copies to DDC users only.

Descriptors: (*Continuum mechanics, *Photoelasticity), Mechanics, Stresses, Strain (Mechanics), Flow visualization, Plasticity

The purpose of this paper is to present some experimentally determined properties of the continuum. The development starts with the illustration of deformed shapes, or metamorphoses, and the introduction of the concept of displacement. From there on, the development follows the classic mechanics-of-continuum presentation, spatial and time derivatives of displacement, strains, stresses and rigid rotations. To unify the presentation, all considerations are applied to the case of a circular ring subjected to diametral compression. Particular advantage is taken of grids, moire, brittle-coatings and photoelasticity methods to obtain the physical representations of the properties. The following loci are considered: isokinetics, isothetics, isogonics, isoclinics of displacement, displacement trajectories, loci of partial derivatives, isogyros, isotenics, isochromatics, isoclinics of strain and stress, isostatics, isopachics, isobars, isostrophics and isoentaticst The understanding of the properties of these fields helps in the visualization of the mechanics of the continuum, in general, and may prove to be particularly useful in the fields of plasticity and finite strain. (Author)

AD-632 399 Fld. 20/11
NORTH CAROLINA STATE UNIV RALEIGH
PERIODIC MOTION OF A SIMPLE PENDULUM WITH PERIODIC DISTURBANCE,
by R. A. Struble, and J. A. Marlin. 24 Aug 64, 14p. Contract DA-ARO (D)-31-124-G630,
AROD 4105:10

Unclassified report

Availability: Published in Quarterly Journal of Mechanics and Applied Mathematics v18 pt4 p405-17 Nov 1965. Copies to DDC users only.

Descriptors: (*Motion, *Suspension devices), Perturbation theory, Equations of motion, Theorems

Several theorems on the existence of oscillatory and rotary periodic motions of a simple pendulum with periodic disturbance are proved. These theorems are very general and include subharmonic and ultraharmonic solutions as well as harmonic solutions and cover the cases of large disturbance as well as small. For oscillatory periodic motions, two methods of estimating the amplitudes of the oscillations are considered. One of these methods is of the perturbational type for small disturbance, whereas, the other is applicable to a wide class of motions both perturbational and nonperturbational in nature. (Author)

AD-632 442 Fld. 20/11
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
SURVEY OF THE THEORY OF RUBBERLIKE ELASTICITY,
by W. R. Krigbaum, and Ryong-Joon Roe. 1964, 32p. Contract DA-ARO (D)-31-124-G580,
AROD 3222:3

Unclassified report

Prepared in cooperation with Dupont de Nemours (E. I.) and Co., Inc., Niagara Falls, N. Y. Electrochemicals Dept.

Availability: Published in Rubber Chemistry and Technology v38 n5 p1039-69 Dec 1965. Copies to DDC users only.

Descriptors: (*Elasticity, Theory), Stresses, Strain (Mechanics)

AD-632 446 Fld. 20/11
TECHNION - ISRAEL INST OF TECH HAIFA
EQUILIBRIUM AND STABILITY EQUATIONS FOR DISCRETELY STIFFENED SHELLS,
by M. Baruch. 1 May 65, 10p. Contract AF-EOAR-58-63,

Unclassified report

Availability: Published in Israel Journal of Technology v3 n2 p138-46 1965. Copies to DDC users only.

Descriptors: (*Structural shells, *Stiffened cylinders), (*Stability, Equations), Israel

A method of analysis for stiffened shells is developed which considers discrete stiffeners and takes into account the eccentricity of the stiffeners. The stiffeners are concentrated along their orthogonal curvilinear coordinates with the aid of the Dirac delta function. As an example, the stability equations are developed for a cylindrical shell stiffened by equally spaced unequal rings and equally spaced equal stringers.

AD-632 452 Fld. 20/11
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
BUCKLING OF ORTHOTROPIC CONICAL SHELLS UNDER EXTERNAL PRESSURE,
by J. Singer, and R. Fersht-Scher. Jul 63, 19p. Contract AF-EOAR-62-61,

Unclassified report

Availability: Published in The Aeronautical Quarterly v15 p151-68 May 1964. Copies to DDC users only.

Descriptors: (*Buckling (Mechanics), *Structural shells), Conical bodies, Pressure, Stability, Israel

Donnell type stability equations for thin circular orthotropic conical shells are presented and solved for external pressure loading. The solution is likewise applied to stiffened conical shells by consideration of equivalent orthotropic shells. Typical cases are computed and compared with corresponding isotropic shells. Correlation with equivalent cylindrical shells then yields a simple approximate stability analysis for orthotropic or ring-stiffened conical shells under hydrostatic pressure. (Author)

AD-632 454 Fld. 20/11
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO
THE EFFECT OF PLASTIC DEFORMATION ON THE STRAIN ENERGY RELEASE RATE IN A CENTRALLY NOTCHED PLATE SUBJECTED TO UNIAXIAL TENSION.
Final rept. Dec 64-Jul 65,
by Royce G. Forman. Jan 66, 34p. Rept. no. AFFDL-TR-65-186,
Proj. AF-1467, Task 146704,
Unclassified report

Descriptors: (*Fracture (Mechanics), *Metal plates), Corrections, Deformation, Stresses, Strain (Mechanics)

By using the Dugdale model for a crack in a plate, an improved formula was derived for the strain energy release rate, G. The formula has the same form as the solution for a linear elastic plate, except a correction factor is used which corrects for both the effect of yielding and the finite width of the plate. Curves are presented giving the values of the correction factor, and they indicate that the nominal stress to yield stress ratio has a pronounced effect on the strain energy release rate. (Author)

AD-631 850 **See Fld. 11/6**

AD-632 123 **See Fld. 1/3**

AD-632 286 **See Fld. 12/1**

AD-632 416 **See Fld. 20/5**

AD-632 450 **See Fld. 17/7**

AD-632 585 **See Fld. 13/9**

20/12. SOLID STATE PHYSICS

AD-631 845 Fld. 20/12, 20/14
CFSTI Prices: HC $1.00 MF $0.50
ROYAL INST OF TECH STOCKHOLM (SWEDEN) MICROWAVE DEPT
MICROWAVE EMISSION FROM N-TYPE INSB FOR VERY LOW ELECTRIC FIELDS.
Rept. for 1 Jun 65-15 Jan 66,
by Toshimitsu Musha, Frank Lindvall, and Jarl Hagglund. 20 Jan 66, 16p. Rept. no. Scientific-3,
Contract AF 61 (052)-895,
RADC TR-66-188
Unclassified report

Descriptors: (*Microwaves, *Semiconductors), (*Indium alloys, Antimony alloys), Sweden, Cryogenics, Electric fields, Magnetic fields, S band, Rods

A new type of microwave radiation (at 2-4 kMc) was observed from n-type InSb bars at 77K, which were subject to low electric field and high magnetic field simultaneously. The threshold electric and magnetic fields for onset of the microwave emission are, respectively, 3 V/cm and 4 kgauss. The emission of microwave radiation is associated with the nature of the contacts between the specimen and the electrodes. The radiation temperature ranges from 1000K (noise level) to 300,000K. (Author)

AD-631 867 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
DELAWARE UNIV NEWARK DEPT OF PHYSICS
STATIONARY SOLUTIONS FOR INHOMOGENEOUS FIELD DISTRIBUTION IN HOMOGENEOUS SEMICONDUCTORS IN A RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY.
Technical rept.,
by K. W. Boer, and P. L. Quinn. Apr 66, 17p.
Rept. no. TR-8,
Contract Nonr-4336 (00),
Unclassified report

Descriptors: (*Semiconductors, Reaction kinetics), Mathematical models, Differential equations, Electrical conductance, Carriers (Semiconductors), Field theory

For a simple reaction-kinetic model of a homogeneous semiconductor layer-like field inhomogeneities have been shown to occur if and only if the decrease in conductivity is stronger than linear with increasing field. Such negative differential conductivity may be the result of either a field-dependent carrier concentration of a field-dependent mobility. The paper discusses only the stationary solutions of a system of differential equations representing the reaction-kinetic models of both these cases.

AD-631 958 Fld. 20/12, 20/5
CFSTI Prices: HC $4.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
AN INVESTIGATION OF ENERGY BAND STRUCTURE AND ELECTRONIC PROPERTIES OF LEAD SULFIDE AND LEAD SELENIDE.
Materials Theory Group and Energy Conversion and Semiconductor Lab. technical repts.,
by Sohrab Rabii. 15 Jan 66, 122p. Rept. no. TR-3 ,Rept. no. 1
Contract DA-31-124-ARO (D)-92,Nonr-1841 (51) Proj. DSR-7984,
Unclassified report

Doctoral thesis submitted 15 Jan 66.

Descriptors: (*Lead compounds, *Band theory of solids), (*Sulfides, Band theory of solids), (*Selenides, Band theory of solids), Electrons, Perturbation theory, Nuclear spins, Crystal substructure, Potential theory, Electron transitions, Semiconductor devices, Lasers, Lead alloys, Selenium alloys

The Augmented Plane Wave Method of energy band calculation was used to calculate the non-relativistic band structure of lead sulfide and lead selenide. Spin-orbit interaction and mass-velocity and Darwin corrections were then applied as perturbation to these results to obtain the so-called relativistic band structure of these materials. A perturbation was carried out on the conduction and valence band edges, at point L on the surface of the Brillouin Zone, to determine the nature of the constant energy surfaces and the effective masses and g-factors for the conduction and valence bands. The non-parabolic character of the band edge has been studied. The effect of the strain on the electronic properties of these materials has been studied through the calculation of their deformation potential constants. A comparison is made between the calculated results for the lead salt family with the experimental data, and various deductions are maderegarding their properties. (Author)

AD-632 006 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
PHILCO BLUE BELL PA APPLIED RESEARCH LAB
IMPURITY DOPED PHOTOCONDUCTORS.
Final rept. 1 May-31 Dec 65,
by R. B. Emmons, and C. J. Repper. 31 Dec 65, 25p. Rept. no. A055-F,
Contract Nonr-4848 (00), Proj. NR-015-226,
Unclassified report

See also AD-619 289.

Descriptors: (*Photoelectric materials, *Doping), (*Semiconductors, Photoelectric materials), Photoconductivity, Impurities, Gallium, Silicon, Germanium, Cryogenics, Hall effect, Gallium alloys, Arsenic alloys, Manganese, Electrical properties, Optical properties

A model for the optical cross section of deep centers, which is superior to the hydrogenic model used for shallow centers, has been developed. Gadoped Si appears to be a sensitive extrinsic photoconductor that can be more heavily doped than available Ge photoconductors. The characteristics of the particular Ga-doped Si examined are N sub D = 1.2 x 10 to the 16th power/cu cm, N sub D = 2 x 10 to the 14th power/cu cm, E sub A = 0.071ev, Blip temperature = 40K, Detectivity = 6 x 10 to the 8th power cm (cps) 1/2/watt, and tau = 10 to the minus 9th power second at 40K. These results appear to justify examination of Si doped closer to the Ga solubility limit (4 x 10 to the 19th power/cu cm). (Author)

AD-632 145 Fld. 20/12
CFSTI Prices: HC $1.10 MF $0.50
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE
OPTICAL SPECTROSCOPY OF SEMICONDUCTOR MATERIALS.
Annual summary rept. no. 2, 1 Jan-31 Dec 65,
by M. Balkanski. 31 Dec 65, 8p. Contract AF 61 (052)-789,
AFCRL 66-221
Unclassified report

See also AD-627 066.

Descriptors: (*Semiconductors, Optical properties), (*Silicon, Semiconductors), (*Germanium, Semiconductors), Doping, Carriers (Semiconductors), Absorption spectrum, Crystal lattices, Dynamics, Spectroscopy, Solid state physics, France

Problems concerning lattice dynamics, absorption on free carriers and galvanomagnetic properties of highly doped and degenerate Silicon are studied.

AD-632 223 Fld. 20/12, 9/1
CARNEGIE INST OF TECH PITTSBURGH PA
THE PHOTOVOLTAIC RESPONSE OF NGE-NSI HETERODIODES.
Revised ed.,
by J. P. Donnelly, and A. G. Milnes. 14 Oct 65, 6p. Contract DA-31-124-ARO (D)-131,
AROD 3397:11
Unclassified report

Revision of manuscript submitted 2 Jul 65.

Availability: Published in Solid-State Electronics v9 p174-8 1966. Copies to DDC users only.

Descriptors: (*Diodes (Semiconductor), Photoelectric effect), Germanium, Silicon, Band theory of solids, Cryogenics, Doping

The photovoltaic response of the nGe-n Si diodes are in agreement with the I-V characteristics and the band diagram postulated by Oldham and Milnes. (Author)

AD-632 316 Fld. 20/12, 11/7, 20/2, 11/6
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB
SUPPLEMENT TO MAY 1965 REPORT ON MATERIALS SCIENCES RESEARCH.
Annual technical rept. 1964-65.
1 Nov 65. 97p. Contract SD-131,
Unclassified report

Descriptors: (*Materials, Scientific research), (*Solid state physics, Scientific research), Cryogenics, Superconductivity, Crystallography, Spectroscopy, Semiconductors, Crystal lattice defects, Electronics, Phase studies, Band theory of solids, High-pressure research, Radiation damage, Metals

Brief summaries are given of research progress and results on ARPA and AEC Supported research at the UI Materials Research Laboratories in the areas of cryogenics, crystallography, spectroscopy, metal physics, superconductivity, semiconductors, solid state physics and electronics, phase studies, high -pressure research, radiation damage, and related topics.

AD-632 334 Fld. 20/12, 7/4, 20/2
DUKE UNIV DURHAM N C DEPT OF PHYSICS
NUCLEAR MAGNETIC RESONANCE IN SOLID H2 AND D2 UNDER HIGH PRESSURE,
by Samuel A. Dickson, and Horst Meyer. 7 Dec 64, 10p. Contract Nonr-1181 (12),DA-ARO (D)-31-124-G732

Unclassified report

See also AD-601 933.

Availability: Published in The Physical Review v138 n4A pA1293-302 May 17, 1965. Copies to DDC users only.

Descriptors: (*Solidified gases, Nuclear magnetic resonance), (*Hydrogen, Nuclear magnetic resonance), (*Deuterium, Nuclear magnetic resonance), Phase studies, Transition temperature, Density, Dipole moments, Crystal lattices, X-ray diffraction analysis, Neutron diffraction analysis, High-pressure research, Low-temperature research

Nuclear magnetic resonance data are presented for solid H2 and D2 between 1.5 and 4.2K and at pressures up to 5500 atm. For solid hydrogen, the ortho-para conversion, the transition temperature from the state of free rotation to that of a more ordered state, and the linewidth and second moment above the transition temperature have been measured as a function of density and ortho concentration. These results are compared with other experimental evidence and with theoretical expectations. The second moment for both H2 and D2 (the latter with an ortho concentration of 0.67) is compared to that calculated for the dipole-dipole interaction in a rigid lattice having the structure and dimensions determined from x-ray and neutron data. The experimental second moments are found to be larger than the calculated ones, and the discrepancy is discussed. (Author)

AD-632 371 Fld. 20/12
PENNSYLVANIA UNIV PHILADELPHIA
GAMMA-GAMMA ANGULAR-CORRELATION STUDY OF TM169 IN LUTETIUM IRON GARNET,
by S. Kiocki, A. Kiocki, G. T. Woods, and M. E.-Caspari. 13 Sep 65, 9p. Contract DA-ARO (D)-31-124-G66,
AROD 3006:7

Unclassified report

Availability: Published in The Physical Review v143 n1 p148-56 Mar 4 1966. Copies to DDC users only.

Descriptors: (*Thulium, Hyperfine structure), (*Garnet, Impurities), Lutetium compounds, Iron compounds, Ytterbium, Electron capture, Cryogenics, Nuclear spins, Relaxation time, Magnetic fields, Magnetic moments

The attenuation and rotation of the integral angular correlation of the 7/2 (177-keV) 7/2 (131-keV) 3/2 gamma -gamma cascade in Tm169 following electron capture of Yb169 was measured in dilute solutions of Yb169 in polycrystalline samples of lutetium iron garnet at room temperature and at liquid-nitrogen temperature with and without applied magnetic field. The same measurements were also performed on the 7/2 (198-keV) 5/2 (110-keV) 3/2 gamma-gamma cascade at liquid-nitrogen temperature. From these experiments the magnetic hyperfine field acting at the nuclei of the Tm (3+) ions, the electronic relaxation time at the Tm (3+) ions, and the ratio of the g factors of the 7/2 + and 5/2 + spin states in Tm169 could be deduced. At room temperature the time-averaged magnetic hyperfine field in the direction of the magnetizing field was 206 kOe and agreed within 10% with that calculated from molecular-field theory using the free-ion model with an exchange field of 196 kOe and neglecting inner-core exchange-polarization effects. The value of magnetizing field at liquid-nitrogen temperature averaged over all sites was 523 kOe. Neglecting quadrupole effects, the electronic relaxation time of the Tm (3+) electrons was estimated to be 3.8 X 10 to the -13 power sec at room temperature and 1.8 X 10 to the -12 power sec at liquid -nitrogen temperature, consistent with an inverse dependence of the relaxation time on the absolute temperature. The ratio of the g factors was determined to be g7/2/g5/2 = 1.28 plus or minus 0.12. (Author)

AD-632 383 Fld. 20/12, 20/2
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING
RESISTIVITY CONTROL OF GE GROWN BY GEI2 DISPROPORTIONATION.
Revised ed.,
by A. R. Riben, D. L. Feucht, and W. G. Oldham. 16 Jan 65, 2p. Contract DA-ARO (D)-31-124-G287,
AROD 3397:9

Unclassified report

Revision of manuscript submitted 11 Dec 64.

Availability: Published in Journal of Applied Physics v36 n11 p3085-6 Nov 1965. Copies to DDC users only.

Descriptors: (*Germanium, Epitaxial growth), (*Germanium compounds, Iodides), Disproportionation, Resistance (Electrical), Impurities, Iodine, Vapor pressure

AD-632 403 Fld. 20/12, 11/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A STUDY OF THE MAGNETIC PROPERTIES AND FERROMAGNETIC RESONANCE OF THE YTTRIUM -LANTHANUM IRON GARNET SYSTEM.
Research translation,
by Li Guo-dong. Feb 66, 25p. Rept. no. Emm-65-11,
Contract AF 19 (628)-5073,
TT 66-61210

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v19 n1 p1-10 1963. See also TT-62-32994.

Descriptors: (*Garnet, *Magnetic properties), (*Ferromagnetism, Garnet), Yttrium, Lanthanum, Iron Resonance, Ferrites, Phase studies, Permeability, Crystal lattices, Oxides, Magnetic moments, China

The paper studies the magnetic properties and ferromagnetic resonance of the yttrium-lanthanum iron garnet system Y3 (1 - x)La3xFe5O12 at compositions where x = 0, 0.5, 0.10, 0.20, 0.30, 0.50, 0.75 and 1.00. The single-phase region with the garnet structure determined by X-ray powder pattern analysis and metallographic observations extends to approximately 0.10 < x < 0.20. However, magnetic and ferromagnetic resonance observations indicate a somewhat narrower single-phase region. The saturation magnetic moment per gram sigma, initial permeability mu, coercive force Hc, effective g-factor g (eff) and resonance line-width delta H (at 3970 and 9160 Mc/sec) are measured as a function of the compositions. Variations in sigma with composition and the magnitude of mu as viewed from various magnetization mechanisms are discussed. From the frequency dependence of g (eff), the intrinsic g-factors and internal fields H1 of the materials are computed. Exponential dependence of delta H, Hi and Hç on x in certain composition regions observed experimentally is interpreted from the viewpoint of magnetic inhomogeneity. (Author)

AD-632 404 Fld. 20/12, 20/10
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
THE QUANTUM THEORY OF FERROMAGNETIC RESONANCE, THE RESONANCE CONDITIONS OF AN ISOTROPIC FERRITE.
Research translation,
by Yang Ch'i. Mar 66, 26p. Rept. no. Emm-65-15,
Contract AF 19 (628)-5073,
TT 66-61211

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v19 n3 p139-50 1963.

Descriptors: (*Ferromagnetic materials, Magnetic resonance), (*Magnetic resonance, Quantum mechanics), Crystal lattices, Hamilotonian, Green's function, Magnetic properties, Nuclear spins, Thermodynamics, China

The paper considers problems concerning the ferromagnetic resonance of an isotropic ferrite containing two magnetic sublattices, using the method of double-time Green functions. The magnetic susceptibility formulas and the resonance conditions obtained in the first approximation agree with the corresponding results of classical theory. The proposed theory is applicable in a wide range of temperatures. It also leads naturally to an expression for the probability of resonance transition of a spin system (a probability which is proportional to the intensity of the resonance line). Problems relating to the area of application of the theory and to the necessary corrections to be made in the neighborhood of the compensation point are discussed. (Author)

AD-632 409 Fld. 20/12, 20/13, 11/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
THE EFFECT OF HEAT TREATMENT ON THE FERROMAGNETIC RESONANCE OF LUTECIUM IRON GARNET AND MANGANESE FERRITE SINGLE CRYSTALS.
Research translation,
by Li Guo-dong, and Tan Sheng-shu. Mar 66, 20p. Rept. no. Emm-65-39,
Contract AF 19 (628)-5073,
TT 66-61216

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n3 p261-9 1964.

Descriptors: (*Garnet, *Ferromagnetism), Lutecium, Iron, Manganese compounds, Ferrites, Oxides, Single crystals, Heat treatment, Anistropy, X-ray diffraction analysis, Iron compounds, Resonance, China

In this paper, the Effects of different heat treatments on the ferromagnetic resonance of lutecium iron garnet (Lu3Fe5O12) and manganese ferrite (MnFe2O4) single crystals are investigated. The two heat treatments applied are, respectively, 700C in air for one hour and 700C in oxygen for ten hours. It is found that these treatments have no significant effect on the values of K1/Ms and the g-factors, except that the anisotropy of the resonance line width delta H decreases appreciably. Although the effect on delta H of Lu3Fe5O12 is small, the delta H value of MnFe2O4 increases several times after each treatment. The cause for

the variation of delta H with heat treatment is discussed. X-ray diffraction patterns show that a small quantity of alpha-Fe2O3 precipitates in the manganese ferrite specimen after the latter is subjected to heat treatment. (Author)

AD-632 411 Fld. 20/12, 20/3
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
THE INTERACTION OF S-ELECTRONS WITH SPIN WAVES IN A FERROMAGNETIC,
Research translation,
by Sun Hsin. Mar 66, 27p. Rept. no. Emm-65-38,
Contract AF 19 (628)-5073,
TT 66-61218

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n3 p193-206 1964.

Descriptors: (*Ferromagnetic materials, *Electrons), Wave functions, Scattering, Temperature, Absorption, Green's function, China

In this paper, the emission and absorption of spin waves by s-electrons and the attenuation of spin waves caused by the interaction of s-electron and spin-wave scattering are computed using the double-time Green function. The results show that at low temperatures, only those waves with wave vectors at 10 to the 6th < k < 10 to the 8th are emitted or absorbed by s-electrons. The attenuation of waves thus produced is much greater than that caused by spin-wave interaction. The attenuation due to scattering of spin waves by s-electrons is less than that due to the scattering of spin waves among themselves. It is therefore possible that there is an absorption band at 10 to the 6th < k < 10 to the 8th. (Author)

AD-632 430 Fld. 20/12, 7/4
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
ZEEMAN EFFECTS IN THE EDGE EMISSION AND ABSORPTION OF ZNO,
by D. C. Reynolds, C. W. Litton, and T. C. Collins. 28 Jun 65, 11p. Rept. no. ARL-66-0042,

Unclassified report

Availability: Published in The Physical Review v140 n5A pA1726-34 Nov 29 1965. Copies to DDC users only.

Descriptors: (*Absorption spectrum, Zinc compounds), (*Zinc compounds, Oxides), Emissivity, Magnetic fields, Band spectrum, Atomic orbitals, Optical phenomena, Line spectrum, Fluorescence

Of the more than 20 sharp characteristic emission and absorption lines observed in the edge emission and absorption spectra of ZnO platelets, several typical lines have been examined in detail experimentally at low temperatures (about 1K). Zeeman effects, in magnetic fields up to 45 000 G, have been studied in singlets as well as zero -field-split doublets. In particular, the magnetic splitting of I9 (an emission line appearing at 3692.64 A) has been studied as a function of magnetic field orientation (angular orientation of c axis with respect to field direction). A zero-field-split fluorescent doublet, I2-I3 (3680.63, 3681.59 A), which splits nonlinearly as a function of field strength, has been studied as a function of field orientation. The I2-I3 doublet has been attributed to an ionized exciton complex, and effective electron and hole g values have been determined. Electron g values are isotropic and essentially the same for all of the lines (about - 1.95)C while the hole g value is not only anisotropic for each line, but also assumes different values in the different complexes (lines), indicating that the hole is sensitive to its state of binding in the exciton complex. (Author)

AD-632 458 Fld. 20/12, 18/8
CFSTI Prices: HC $1.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Quarterly progress rept. no. 1, 1 Oct-31 Dec 65,
by John C. Corelli, and A. Robb Frederickson.
May 66, 15p. Contract DA-28-043-AMC-01788 (E), Task OST-5900-21-830-44-00-(DASA),
ECOM 01788-1

Unclassified report

Descriptors: (*Semiconductors, *Electron bombardment), Damage, Silicon, Electrical conductance, Hall effect, Voltage, Ionization, Life expectancy, Recombination reactions, Radiation damage

The report gives the first results of transient radiation damage experiments designed primarily to cover a wide range of electron flux (about 10 to the 5th power-10 to the 10th power e/sq cm in the pulse). The incident electron energy was 48 MeV and the electron beam pulse widths used were in the range 1 to 4.5 micro sec. The samples studied were 100 ohm -cm floating zone silicon phosphorous and indium doped. The irradiations were carried out with the sample at 100, 200 or 300K to roughly check temperature dependence. The probes used to detect transient radiation damage are the conductivity and Hall effect voltages. The results indicate a saturation in the Hall effect and conductivity voltage pulses for electron fluxes > or about 10 to the 9th power e/sq cm. Both the fractional Hall effect and conductivity voltages (Delta V/V) have the same flux dependence. The main effect in transient radiation damage experiments is one of ionization and recombinations of excess electron hole pairs, and moreover transient atomic displacement damage if present is small and not detectable. (Author)

AD-632 466 Fld. 20/12, 18/8
CFSTI Prices: HC $2.00 MF $0.50
CONTROLS FOR RADIATION INC CAMBRIDGE MASS
THE GENERATION OF AN IMPURITY-VACANCY PAIR IN SILICON DURING IRRADIATION.
Scientific rept.,
by Sumner Mayburg. 8 Apr 66, 31p. Rept. no. Scientific-1,
Contract AF 19 (628)-5214, Proj. AF-5620, Task 562002,
AFCRL 66-181

Unclassified report

Descriptors: (*Silicon, *Radiation damage), Semiconductors, Electron bombardment, Impurities, Carriers (Semiconductors), Oxygen, Atoms, Single crystals, Annealing, Displacement reactions, Recombination reactions, Solid state physics

Equations are solved for the buildup of an impurity -vacancy pair in silicon during irradiation assuming vacancy but not interstitial motion. For a given integrated flux, more pairs are shown to be produced at high than at low bombardment temperatures. When silicon interstitial as well as vacancy motion is considered, the steady-state concentration of vacancies trapped at impurities is found to be r N sub I (I+r) where r is the ratio of interstitial jump time to vacancy jump time and N sub I is the concentration of impurities. The disappearance of the pairs after the irradiation ceases is determined by the jump time of the Si interstitials. Comparison of this simple first order theory with available experiments emphasizes the need for experiments to determine the state of the Si interstitial in irradiated silicon at room temperature. Either the Si interstitial is immobile at room temperature or it is trapped by substitutional impurity atoms as Watkins suggested from experiments on Al doped samples at 4K. (Author)

AD-632 467 Fld. 20/12, 18/8
CFSTI Prices: HC $2.00 MF $0.50
CONTROLS FOR RADIATION INC CAMBRIDGE MASS
THE ADVANTAGES OF THERMAL CONDUCTIVITY IN MEASURED RADIATION PRODUCED COMPLEXES IN SILICON.
Scientific rept.,
by Charles J. Glassbrenner. Mar 66, 30p. Rept. no. Scientific-2,
Contract AF 19 (628)-5214, Proj. AF-5620, Task 562002,
AFCRL 66-208

Unclassified report

Descriptors: (*Thermal conductivity, Silicon), (*Silicon, *Radiation damage), Semiconductors, Damage, Crystal lattice defects, Measurement, Phonons, Heat transfer, Cryostats, Solid state physics

Phonon thermal conductivity theory is explained to show how thermal conductivity measurements can give the number and size of radiation produced complexes. A low temperature thermal conductivity apparatus is described which has a special sample holder for radiation experiments. Proposed experiments to study the radiation damage complexes in silicon containing oxygen and/or carbon are discussed. (Author)

AD-632 539 Fld. 20/12, 18/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J INST FOR EXPLORATORY RESEARCH
ELECTRICAL PROPERTIES OF ELECTRON IRRADIATED GERMANIUM.
Technical rept.,
by Milton Harmatz, and Peter Hollander. Mar 66, 22p. Proj. DA-1P0-14501-B11A, Task 1P0-14501-B11A-01,
ECOM 2682

Unclassified report

Descriptors: (*Semiconductors, *Electron bombardment), (*Germanium, Electron bombardment), Electrical conductance, Hall effect, Electrical properties, Doping, Arsenic, Radiation damage, Life expectancy, Annealing

Measurements of the electrical properties of arsenic -doped germanium irradiated at 300K with electrons and annealed at high temperatures are reported. Bombardments with 1.5 Mev electrons on 1.2 ohm-cm n-type material caused the conductivity to decrease initially to a minimum value after being irradiated with 7 x 10 to the 15th power electrons/sq cm, and then to increase slowly with additional radiation. The negative Hall coefficient increased at first, and then exhibited a reduction when the fluence increased beyond 7 x 10 to the 15th power electrons/sq cm. Hall effect measurements indicated that the material converted to p-type following a fluence of 1.1 x 10 to the 16th power electrons/sq cm. Conversion was observed after the conductivity passed the minimum value. A small decrease of two per cent in the Hall mobility following a fluence of 7 x 10 to the 14th power electrons/sq cm was produced. The data indicated that the carrier removal rate was .6 carriers/electron cm. In irradiated 16 ohm-cm n-type material which had been converted to p-type, reversion occurred rather quickly at an annealing temperature of 312K. The annealing rate was slower following the maximum resistivity and negative Hall coefficient values. The sample was not restored to its pre-irradiated condition following the highest annealing temperature conducted. (Author)

AD-632 552 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
NEW YORK UNIV N Y
INVESTIGATION INTO SELECTED PROBLEMS IN SOLID STATE PHYSICS.
Final rept. 1 Feb 63-1 Feb 66, (In lieu of) semi annual rept. no. 6,
by J. L. Birman. 1 Feb 66, 10p. Contract DA-ARO (D)-31-124-G424, Proj. AROD-4054-P, AROD 4054:14

Unclassified report

Descriptors: (*Solid state physics, Theory), Crystal lattices, Infrared phenomena, Raman spectroscopy, Absorption spectrum, Semiconductors, Luminescence, Cadmium compounds, Sulfide, Phonons, Optical properties, Metals, Potential theory, Molecular orbitals, Approximation (Mathematics)

Brief summaries are given of results of work in the following areas of solid state theory: space group theory (see AD-619 351); application of space group theory to analysis of infra-red and Raman processes in crystals; dynamical theory of infra-red absorption in crystals; dynamical theory of Raman effect in crystals; theory of luminescent centers in II-VI compounds; theory of properties of Wurtzite crystals (phonon dispersion, and optical properties of CdS) (see AD-629 702); theory of phonon dispersion in metals with an optic branch; Born -Oppenheimer (adiabatic) approximation for periodic potentials; configurational instability ('Jahn-Teller effects').

AD-632 611 Fld. 20/12, 7/4
CFSTI Prices: HC $3.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
SOLID-STATE AND MOLECULAR THEORY GROUP.
Quarterly progress rept. no. 60.
15 Apr 66, 52p. Contract Nonr-1841 (34),AF 19(628)-356

Unclassified report

See also AD-628 051.

Descriptors: (*Solid state physics, Reviews), (*Molecular properties, Reviews), Atomic energy levels, Electrons, Crystals, Spin

Contents: Survey; The Spin Dependence of Atomic Multiplet Energies in the Averaged Free-Electron Approximation, by P. DeCicco; Spin Density in Iron, by P. DeCicco and A. Kitz; On Generalized Symmetry Groups in Crystals, by A. Kitz; A Note on the Use of the Noumerov Method in APW Calculations, by P. DeCicco and A. Kitz; Variational Expression for the Energy of a Relativistic Electron, by R. Gilmore; Errata - Wave Functions in Crystalline Solids Expanded in Augmented Plane Waves -- January 1966, no. 59, by W. Rudge; Electrostatic and Dipolar Magnetic Fields in Cubic Crystals, by D. E. Ellis, A. J. Freeman, and p. Ros; and Note on the Bipolar Expansion of 1/r12, by D. E. Ellis.

AD-631 856 **See Fld. 11/6**

AD-631 928 **See Fld. 11/6**

AD-631 959 **See Fld. 20/3**

AD-631 987 **See Fld. 7/2**

AD-632 040 **See Fld. 11/6**

AD-632 083 **See Fld. 9/5**

AD-632 152 **See Fld. 9/1**

AD-632 159 **See Fld. 20/2**

AD-632 268 **See Fld. 7/3**

AD-632 370 **See Fld. 7/4**

AD-632 405 **See Fld. 11/6**

AD-632 425 **See Fld. 9/3**

AD-632 434 **See Fld. 11/6**

AD-632 527 **See Fld. 18/4**

AD-632 554 **See Fld. 20/2**

AD-632 556 **See Fld. 9/1**

AD-632 557 **See Fld. 20/3**

AD-632 608 **See Fld. 11/6**

20/13. THERMODYNAMICS

AD-632 057 Fld. 20/13, 3/2
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
RADIATIVE TRANSFER AND IRREVERSIBILITY,
by J. Oxenius. 12 Jul 65, 28p. Contract DA-31-124-ARO (D)-139,
AROD 4445:37

Unclassified report

Supported in part by ARPA, Proj. Defender.

Availability: Published in Journal of Auantitative Spectroscopy and Radiative Transfer v6 p65-91 1966. Copies to DDC users only.

Descriptors: (*Gases, Thermodynamics), (*Atomic Energy levels, *Entropy), Electron transitions, Mathematical models, Kinetic theory, Quantum mechanics, Line spectrum, Electromagnetic waves, Photons

The irreversibility of the interaction of radiation with matter is investigated by considering a stationary isothermal gas that emits the resonance line of atoms with only two discrete energy levels. In order to describe such a situation microscopically, the steady-state balance of the occupation numbers of the atomic levels and the equation of radiative transfer have to be taken into account simultaneously. The explicit expressions for the non - equilibrium entropies and temperatures of the radiation field and of the gas of the two-level atoms are derived in a systematic way. In the framework of the model considered, the kinetic temperature is an upper limit for both the radiant temperature and the excitation temperature. The local production of radiant entropy, integrated over the whole spectral line, is always positive, but, as a result of non-coherent scattering, it can be negative in certain frequency intervals. The radiant entropy produced by the entire atmosphere is, however, positive for every frequency emitted. Likewise, the total local entropy production is, in agreement with the Second Law, always positive. It is further shown that an anisotropic radiation field has a smaller entropy density and a greater production of radiant entropy than the isotropic radiation field of equal spectral distribution of energy. As an example, an atmosphere is treated numerically that emits a spectral line of large optical thickness under extreme non-equilibrium conditions. (Author)

AD-632 124 Fld. 20/13, 20/4, 13/1
CFSTI Prices: HC $3.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS LAB
THE EVAPORATOR TUBE - STATE OF THE ART,
by S. William Gouse Jr., and Andrew J. Dickson.
Jan 66, 77p. Rept. no. DSR-8734-7,
Contract Nonr-1841 (73),

Unclassified report

Descriptors: (*Evaporators, *Convection (Heat transfer)), (*Two-phase flow, Evaporators), (*Heat transfer, Evaporators), Pipes, Fluid flow, Boiling, Evaporation, Heat transfer coefficients, Hydrodynamics, Thermodynamics, Kinetic theory, State-of-the-art reviews

The purpose of this study was to examine the literature on the forced or natural convection flow of an evaporating and/or boiling fluid in tubes and channels of various geometries and orientations, with emphasis on those conditions where the flow enters the heated section at the saturation temperature, and leaves after net vapor generation has taken place. No attempt is made to review all of the correlations and experiments that are currently available in the literature, only those which seem to have received significant support from a variety of users. (Author)

AD-632 297 Fld. 20/13
PACIFIC NAVAL LAB ESQUIMALT (BRITISH COLUMBIA)
SOME QUANTITATIVE CHARACTERISTICS OF THE SCHUMANN-ELF NATURAL ELECTROMAGNETIC BACKGROUND,
by J. A. Shand. 29 Nov 65, 12p. Rept. no. Reprint 66-1,

Unclassified report

Availability: Published in Canadian Journal of Physics v44 p449-59 1966. Copies to DDC users only.

Descriptors: (*Electromagnetic waves, Extremely low frequency), Measurement, Power, Signals, Wave transmission, Propagation

Samples of Schumann-ELF natural background recorded in three components at widely separated points have been resolved, both by analogue and digital methods, into their constituent modes for quantitative comparison. ELF bursts display a world-wide coherence and uniform average signal strength to a high degree. Corresponding X and Y component traces are virtually identical at sites separated by 1 000 km or less. In contrast, among stations set in differing geological environments the strength of the vertical magnetic components of the same bursts may vary by orders of magnitude. No evidence of solar, auroral, or other nonlightning sources for natural ELF activity has been found. (Author)

AD-632 388 Fld. 20/13, 20/4
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
EXPERIMENTAL STUDY OF HEAT TRANSFER FROM A HEATED CIRCULAR CYLINDER IN TWO-PHASE, WATER-AIR, FLOW.
Master's thesis,
by Edmund W. Takahara. Mar 66, 76p. Rept. no. GAM-66B/ME/66-5,

Unclassified report

Descriptors: (*Heat transfer, *Two-phase flow), Experimental data, Water, Air, Cylindrical bodies

The rate of heat transfer is very sensitive to the quantity of water in the two-phase mixture and is 14.9 times greater than that for single-phase flow at a Re of 4.8x10 to the 4th power. The film coefficient of heat transfer increases with Re but the amount of water in the boundary layer is the dominating factor. The local film heat transfer coefficient in two-phase flow is greatest at the stagnation point; it decreases with distance away from the leading edge and becomes essentially equal to the single-phase value at an angle where the liquid film separates from the cylinder. (Author)

AD-632 395 Fld. 20/13
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THE EFFECT OF LONGITUDINAL VIBRATIONS ON HEAT TRANSFER BY FREE CONVECTION IN AIR, WATER, AND A VISCOUS HYDROCARBON POLYMER.
Master's thesis,
by Olin H. Bradley. Mar 66, 93p. Rept. no. GAM/ME/66A-1,

Unclassified report

Descriptors: (*Air, Heat transfer), (*Water, Heat transfer), (*Polymers, Heat transfer), (*Heat transfer, Vibration), Cylindrical bodies, Convection (Heat transfer), Hydrocarbons, Bubbles, Heat transfer coefficients

An experimental study was made on the effect of longitudinal vibrations on heat transfer by free convection from a horizontal cylinder in air, water, and a viscous hydrocarbon polymer (polybutene). Tests were conducted in which the frequency (f) was varied from 0 to 86 cps and the amplitude (x) from 0.005 to 0.16 in. Results of the testing showed no change in the rate of heat transfer for air. The rate of heat transfer in water increased up to 73% when bubbles were attached to the cylinder and increased up to 10% when no bubbles were present. Tests in the viscous hydrocarbon caused appreciable viscous heating. The rate of heat transfer in the viscous polymer increased to a maximum of 216%. The tests in water and the hydrocarbon polymer showed that the rate of heat transfer began to increase at a vibration intensity of fx = 0.4 and fx = 1.0 respectively (fx is the intensity of vibration cps in.). It is recommended that further tests be made using larger amplitudes and frequencies. (Author)

AD-632 397 Fld. 20/13
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THE EFFECT OF A TRANSVERSE NOTCH ON THE HEAT TRANSFER RATE FROM A HEATED VERTICAL PLATE IN FREE CONVECTION.
Master's thesis,
by Carl C. Fletcher. Mar 66, 77p. Rept. no. GAM/ME/66A-2,

Unclassified report

Descriptors: (*Heat transfer, *Notch sensitivity), Metal plates, Convection (Heat transfer)

Based on the results of this study, the following conclusions are drawn: (1) The notch effect on heat transfer is local in nature with the range of influence restricted to a region from about one inch below the notch to about two inches above the notch. (2) The net notch effect is to increase the heat transfer; the maximum increase obtained was 8.6% over the region influenced by the notch, whereas the minimum increase was 3.1%. Heat transfer in the notch interior is reduced; however, heat transfer exterior to the notch is increased and is dominant. (3) For notch depths between 0.2 and 1.0 inch, the heat transfer rate is independent of notch depth. (4) Heat transfer increase in a funtion of notch elevation; it decreases with elevation up to the point at which the flow normally begins the transition to a turbulent flow and increases beyond this point. (5) The flow pattern about the notch centerline is unsymmetrical. (Author)

AD-632 429 Fld. 20/13, 7/2, 7/4
SAN DIEGO STATE COLL CALIF DEPT OF CHEMISTRY
BOND ADDITIVITY PROPERTIES OF SILICON COMPOUNDS,
by H. E. O'Neal, and M. A. Ring. 9 Aug 65, 4p.
Contract DA-ARO (D)-31-124-G465,
AROD 4192:4

Unclassified report

Supported in part by NSF.

Availability: Published in Inorganic Chemistry v5 p435 -8 1966. Copies to DDC users only.

Descriptors: (*Silicon compounds, Thermodynamics), (*Silanes, Thermodynamics), Chemical bonds, Entropy, Enthalpy, Heat of formation, Gases, Alkanes, Carbon compounds

A compilation and evaluation of combustion and heat of formation data and of entropy and heat capacity data for the ideal gas state at 298.17K on silicon compounds has been made, and the thermodynamic bond additivity relations of some silicon-ligand bonds have been determined. These additivities may be used to estimate heat capacities and entropies of silicon compounds with an accuracy generally better than plus or minus 1 eu and to estimate silicon compound enthalpies of formation to an accuracy generally better than plus or minus 3 kcal/mole. It is noted that additivity relations hold surprisingly well for all silicon compounds with the exception of the alkylsilanes. This suggests that the data for the alkylsilanes are in error and that the current conclusion that the silicon-carbon bond energy appreciably decreases with increasing size of the alkyl ligand is also erroneous. (Author)

AD-631 854 See Fld. 14/2

AD-631 924 See Fld. 7/4

AD-631 960 See Fld. 20/4

AD-632 080 See Fld. 8/13

AD-632 291 See Fld. 11/6

AD-632 386 See Fld. 22/2

AD-632 409 See Fld. 20/12

AD-632 422 See Fld. 20/9

AD-632 487 See Fld. 22/2

AD-632 514 See Fld. 11/12

AD-632 533 See Fld. 16/2

20/14. WAVE PROPAGATION

AD-631 998 Fld. 20/14
CFSTI Prices: HC $4.00 MF $0.75
MICHIGAN UNIV ANN ARBOR RADIATION LAB
THEORETICAL AND EXPERIMENTAL STUDY OF THE SCATTERING BEHAVIOR OF A CIRCUMFERENTIALLY -LOADED SPHERE.
Scientific rept.,
by Valdis V. Liepa, and Thomas B. A. Senior.
Feb 66, 123p. Rept. no. 5548-5-T, Scientific-5
Contract AF 19 (628)-2374, Proj. AF-5635,
Task 563502,
AFCRL 66-124

Unclassified report

Descriptors: (*Electromagnetic waves, Scattering), (*Spheres, Field theory), Admittance, Backscattering, Theory, Experimental data, Diffraction, Antenna radiation patterns

The electromagnetic scattering behavior of a metallic sphere loaded with a circumferential slot in a plane perpendicular to the direction of incidence is investigated. The slot is assumed of small but finite width with a constant electric field across it, and under this assumption, the analysis of external fields is exact. The scattered field is obtained by superposition of the field diffracted by an unloaded sphere and that radiated from the excited slot, with the radiation strength and phase determined by the loading parameters. Thus the scattering behavior is determined by the loading admittance and the position of this slot. The numerical study is restricted to the frequency range corresponding to $0 < ka < 10.0$, and the results presented are primarily for passive loading. The maximum and minimum back scattering cross sections and the loading needed to attain these are presented for different loading positions. The bistatic scattering patterns are computed for a sphere loaded for zero back scattering and from these the back scattering null widths are obtained. The extreme total scattering cross sections are evaluated using the forward scattering theorem and, for small values of ka, the result is compared with that obtained by direct integration of the differential cross sections. Experimental data, obtained using a metallic sphere with an equatorial slot backed by a radial cavity of adjustable depth, is presented for the surface field and back scattering measurements. The results are compared with the computed data. (Author)

AD-632 148 Fld. 20/14, 20/3
LINCOLN LAB MASS INST OF TECH LEXINGTON
SCATTERING OF ELECTROMAGNETIC WAVES FROM CONDUCTING SPHERES WITH THIN LOSSY COATINGS,
by John Rheinstein. 18 Jul 65, 2p. Rept. no. JA-2616,
Contract AF 19 (628)-5167,
ESD TDR-66-51

Unclassified report

Availability: Published in IEEE Transactions on Antennas and Propagation vAP-13 n6 p983 Nov 1965. Copies to DDC users only.

Descriptors: (*Electromagnetic waves, Scattering), Spheres, Dielectric films, Electromagnetic wave reflections, Backscatter, Numerical analysis

The results of two sets of computer calculations of the backscatter of electromagnetic waves from conducting spheres with thin lossy coatings are presented and compared with the optics approximation. This work is an extension of a previous paper which illustrated that the creeping wave contribution to the backscatter of a coated sphere may be comparable with the specular contribution even for large spheres. The present note illustrates the reduction of the creeping wave contribution due to loss in the coating. (Author)

AD-632 275 Fld. 20/14, 17/2, 9/5
CFSTI Prices: HC $3.00 MF $0.75
ISTITUTO UNIVERSITARIO NAVALE NAPLES (ITALY)
RADIO SURFACE WAVES.
Annual summary rept.,
by E. Corti, G. Franceschetti, and Gaetano Latmiral. 31 Jan 66, 64p. Contract AF 61 (052)-851, AFCRL 66-214

Unclassified report

Descriptors: (*Radio transmission, Underwater-to-surface), (*Radio waves, Underwater communication system), Antennas, Loop antennas, Linear systems, Italy, Electromagnetic fields, Electrical impedance, Propagation

The link between submerged transmitting and surface receiving antennas was computed by using the Lorentz reciprocity theorem. The resistance radiation of a submerged linear antenna was computed. (Author)

AD-632 299 Fld. 20/14, 4/1
CFSTI Prices: HC $2.00 MF $0.50
NORWEGIAN INST OF COSMIC PHYSICS UNIV OF OSLO
MEASUREMENTS OF THE EARTH-IONOSPHERIC CAVITY RESONANCE FREQUENCIES AT HIGH LATITUDE,
by Alv Egeland, and Trygve Roed Larsen. 21 Feb 66, 42p. Rept. no. Scientific-4,
Contract AF 61 (052)-811,
AFCRL 66-260

Unclassified report

Descriptors: (*Radio waves, *Ionospheric propagation), Geophysics, Extremely low frequency, Electromagnetic waves, Atmospherics, Resonant frequency, Radio equipment, Norway

The earth-ionospheric cavity resonance frequencies were measured by two methods somewhat different from that employed hitherto by other workers. The instruments used were all battery-operated. The recordings have been carried out close to Isfjord Radio, Spitzbergen (geographic latitude 78 deg 03.9 min N) and close to Lavangdalen, Northern - Norway (geographic latitude 69 deg 15.5 min N) during 1965. It has been possible to record detailed power spectra of these cavity resonances by integration over only a few seconds of data. Between DC and 45 c/s average peak frequencies at (7.78 plus or minus 0.08), (14.0

plus or minus 0.15), (20.3 plus or minus 0.2), (32.1 plus or minus 0.2), 32.1 plus or minus 0.3), 37.1 plus or minus 0.3) and 42.9 plus or minus 0.4) c/s have been observed. Also at frequencies above 45 c/s there seems to be strong indications of higher resonance modes. (Author)

AD-631 843 See Fld. 20/9

AD-631 844 See Fld. 20/9

AD-631 845 See Fld. 20/12

AD-631 846 See Fld. 20/9

AD-631 936 See Fld. 20/3

AD-631 990 See Fld. 12/1

AD-632 102 See Fld. 17/2

AD-632 140 See Fld. 9/5

AD-632 318 See Fld. 20/9

AD-632 565 See Fld. 4/1

Field 21-PROPULSION AND FUELS

21/2. COMBUSTION AND IGNITION

AD-632 575 Fld. 21/2, 20/4, 19/4
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV BERKELEY
STUDY OF THE DEVELOPMENT AND STABILIZATION OF DETONATIONS.
Final rept. Oct 64-Oct 65,
by A. K. Oppenheim. Oct 65, 7p. Contract AF-AFOSR-129-65,
AFOSR 66-0777

Unclassified report

Descriptors: (*Detonations, Mechanical waves), (*Combustion, Stability), Flames, Propagation, Acceleration, Gas flow, Mixtures, Pressure, Lasers, Schlieren photography

The main objective of the work was to investigate the processes that govern the acceleration of combustion waves in reactive gas mixtures, to identify the mechanism of the onset of detonation, and to study the multidimensional wave interactions which characterize the structure of the so-called spinning detonation.

AD-632 606 Fld. 21/2, 21/9
CFSTI Prices: HC $4.00 MF $1.00
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
ALUMINUM PARTICLE COMBUSTION.
Technical progress rept. 1 Apr 64-30 Jun 65.
Apr 66, 120p. Rept. no. NOTS-TP-3916,TPR-415

Unclassified report

Descriptors: (*Aluminum, *Combustion), Rocket propellants, Ignition, Particles, Air, Carbon compounds, Monoxides, Oxygen, Hydrogen, Fuel additives

The report includes (1) a short literature survey on the combustion of aluminum particles, (2) a discussion of spherical combustion models and their limitations, and (3) a summary of experimental studies at NOTS on the combustion of aluminum in air, carbon monoxideoxygen, hydrogen-oxygen, and cyanogen-oxygen. Combustion in an inverted gas burner was followed by high-speed cinephotography; quenched residues were examined photomicrographically. Combustion initiated in air by xenon flash was investigated by streak photography and photomicroscopy of quenched residues. Results indicate that aluminum droplets burn by concurrent oxidation at the surface and in a detached reaction zone a distance from the surface. The oxide resulting from surface reaction collects into caps on the droplet surface. The product in the detached zone is Al2O3 smoke. Large oxide droplets and bubbles are associated with shedding of surface oxide present as a consequence of preignition conditions of subsequent surface oxidation. Spinning and jetting are consequences of the presence of a surface oxide. Catastrophic fragmentation appears to be related to the accumulation of surface oxide. (Author)

AD-631 834 See Fld. 20/4

AD-632 087 See Fld. 21/8

21/4. FUELS

AD-631 838 See Fld. 11/8

21/5. JET AND GAS TURBINE ENGINES

AD-631 872 Fld. 21/5, 20/4, 1/1
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
RAMJET TECHNOLOGY. SECTION ON FLOW PROCESSES AND ENGINE PERFORMANCE. CHAPTER 3B. SUPERSONIC INLETS.
Technical memo.,
by I. D. V. Faro, and J. L. Keirsey. Mar 65, 70p. Rept. no. TG-610-3B,
Contract NOw-62-0604-c,

Unclassified report

See also AD-631 715.

Descriptors: (*Ramjet engines, *Supersonic diffusers), (*Ramjet inlets, Supersonic diffusers), (*Aerodynamics, Ramjet inlets), Diffusers, Jet engine inlets, Compressible flow, Boundary layer, Supersonic flow, Axially symmetric flow, Bodies of revolution, Mathematical analysis

The material presented is intended to indicate the important performance indices, diffuser types and methods of theoretical computation of the flow fields and diffuser shapes, and to aid the reader in understanding the areas of judgment essential to the design of a practical, efficient inlet. Typical experimental results illustrate the non-theoretical aspects of the design process, and also indicate the performance levels attainable with certain basic and conventional designs. (Author)

AD-632 302 See Fld. 1/3

21/7. RECIPROCATING ENGINES

AD-632 392 Fld. 21/7
CFSTI Prices: HC $8.60 MF $0.75
LYCOMING DIV AVCO CORP WILLIAMSPORT PA
DESIGN STUDY 250-HORSEPOWER ENGINE MODELS DVS-470 AND DV-625 FOR U. S. ARMY CORPS OF ENGINEERS,
by S. A. Westman. 30 Sep 58, 75p. Rept. no. 2094,
Contract DA-44-009-eng-3687, Proj. 8-49-13-001A,

Unclassified report

Descriptors: (*Diesel engines, Design), Fuel oil, Jet engine fuels, Gasoline, Operation, Army equipment, Air cooled, Performance (Engineering), Feasibility studies, Configuration, Turbosuperchargers

The technical requirements expressed in the 250-horsepower, industrial type engine purchase description published by the Army Corps of Engineers were reviewed, and it was concluded that the development of an engine meeting the requirements is feasible. General characteristics of two alternate proposed size D engines are presented, together with summary characteristics of other engines considered practical to make a complete family of engines with maximum component interchangeability to meet the Corps of Engineers industrial type engine requirements.

AD-632 436 See Fld. 13/11

21/8. ROCKET MOTORS AND ENGINES

AD-632 087 Fld. 21/8, 21/2
CFSTI Prices: HC $1.00 MF $0.50
PURDUE UNIV LAFAYETTE IND SCHOOL OF MECHANICAL ENGINEERING
PARAMETRIC STUDY OF ROCKET INSTABILITY.
Final rept.,
by J. R. Osborn. 10 Jan 66, 7p. Contract AF-AFOSR-753-65,
AFOSR 66-0696

Unclassified report

Descriptors: (*Rocket motors, Combustion), (*Combustion, Stability), Combustion chambers, Rocket propellants, Burning rate, Flame propagation, Pressure, Oscillation, Thermodynamics

The research program was concerned with the determination of those dimensionless parameters that may be employed as criteria for predicting the stability of combustion in a thrust chamber. These dimensionless parameters are related to physical and chemical variables which are available to the design engineer. Both analytical and experimental work were performed to enable the prediction of combustion pressure oscillations and, therefore, avoid them in actual rocket engine design. (Author)

AD-632 439 Fld. 21/8, 7/4
CFSTI Prices: HC $3.00 MF $0.75
REACTION MOTORS DIV THIOKOL CHEMICAL CORP DENVILLE N J
RESEARCH STUDY OF LIGHT EMISSION CAUSED BY PRESSURE FLUCTUATIONS IN ROCKET ENGINES.
Final rept. 1 Jan-31 Dec 65,
by B. Hornstein, C. Budnik, and W. Courtney. Mar 66, 66p. Rept. no. RMD-5520-F,
Contract AF 49(638)-1505, Proj. AF-9711, Task 971101,
AFOSR 66-0779

Unclassified report

See also AD-622 524.

Descriptors: (*rocket motors, Emissivity), (*Spectra (Visible + Ultraviolet), Combustion), Methane, Air, Alkanes, Pressure, Oxygen, Spectroscopy, Carbon monoside, Combustion, Stability, Injectors

The program was to investigate the usefulness of spectroscopy as a diagnostic technique for studying combustion instability in a rocket chamber. Main emphasis was given to investigating pressure and the 3064A (OH) and 4315A (CH) emission as a function of time in order to study the time lag between pressure and emission. The 1100 cps longitudinal mode and the 7100 cps tangential mode in a cylindrical motor 3 inches in diameter and 16 inches long were investigated. Two propellant systems were used, a premixed methane-air gaseous system and a liquid pentane-gaseous air system. Optical results were limited in reproducibility, perhaps because of local turbulent combustion phenomena. Time-averaged spectra indicated no other strong spectral lines in the 2800-4400A range but did indicate that a CO + O continuum existed and became more intense as the chamber pressure increased and particularly when non-impinging jet

injectors were used with pentane-air system. This intense CO + O continuum obscures the CH emission and severely limits the usefulness of spectroscopy as a diagnostic tool. The initiation and dampening of the 1100 cps longitudinal mode was briefly studied. (Author)

21/8.2 SOLID ROCKET MOTORS

AD-632 233 Fld. 21/8.2
CFSTI Prices: HC $5.00 MF $1.00
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
IMPULSE OF REACTIVE FORCE OF SOLID PROPELLANT ROCKETS,
by Ya. B. Zeldovich, M. A. Rivin, and D. A.Frank-Kamenetskii. 31 Jan 66, 194p. Rept. no. FTD-MT-65-244, TT 66-61194
Unclassified report

Edited machine trans. of mono. Impul's Reaktivnoi Sily Porokhovykh Raket, Moscow, 1963 191p.

Descriptors: (*Rocket motors (Solid propellant), Specific impulse), (*Specific impulse, Theory), Combustion products, Thermodynamics, Solid rocket propellants, Heat transfer, Combustion chamber gases, Measurement, Combustion, Scattering, USSR

The book is devoted to thermodynamic theory of calculating the impulse of reactive force of a solid propellant rocket. In it there is presented the thermodynamics of powder gases, thermodynamic calculation of a solid propellant rocket, methods of measurement of specific impulse and calculation of its magnitude for powders of different caloric value. Consideration is given to heat transfer in a solid propellant rocket, the influence of conditions of ignition of the propellant on the magntiude of the specific impulse, reasons for scattering of the magnitude of the specific impulse and methods of measuring this scattering, and the efflux coefficient. The book is designed for scientists and engineers, specializing in the area of rocket technology. (Soviet editor's note)

21/9. ROCKET PROPELLANTS

AD-632 606 See Fld. 21/2

21/9.1 LIQUID ROCKET PROPELLANTS

AD-632 387 Fld. 21/9.1
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
AN INVESTIGATION OF THE PERFORMANCE OF VARIOUS MIXTURES OF HYDROGEN AND METHANE.
Master's thesis,
by Clyde W. McLaughlin. Mar 66, 89p. Rept. no. GAM/ME/66A-6,
Unclassified report

See also AD-604 824.

Descriptors: (*Liquid rocket fuels, Performance (Engineering)), Hydrogen, Methane, Oxygen, Liquid rocket oxidizers, Programming (Computers), Rocket motors (Liquid propellant), Exhaust gases, Velocity, Combustion, Effectiveness, Combustion chambers, Pressure

The primary purpose of this study was to evaluate the performance of various mixtures of hydrogen and methane as a fuel with oxygen as an oxidizer. A computer program was used to provide the theoretical results at a chamber pressure of 60 psia and mixture ratios from 1.5 to 5.0. The fraction of methane in the fuel was varied from 0 to 1.0. Experimental results were obtained by using a small reverse flow rocket engine and three separate propellant feed systems with a mixing chamber to combine the hydrogen and methane prior to the gases entering the fuel manifold of the rocket. A non-linear degradation of characteristic exhaust velocity was found as the fraction of methane in the fuel was increased. The degradation with all methane as the fuel was 77% of the pure hydrogen-oxygen performance. Experimentally, the combustion efficiency was found to decrease with an increasing percentage of methane in the fuel. (Author)

AD-632 461 Fld. 21/9.1, 7/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
THE RADIOLYTIC DECOMPOSITION OF HYDRAZINE, RP-1, AND HYDYNE ROCKET FUELS,
by Wesley E. Shelberg. 5 May 66, 17p. Rept. no. USNRDL-TR-1002,
Proj. SF-111-01-03, Task 11275,
Unclassified report

Descriptors: (*Liquid rocket fuels, Radiation damage), (*Hydrazine, Radiation damage), Hydrocarbons, Kerosine, Dimethylhydrazine (1-1), Amines, Gases, Gamma rays, Fuel additives, Free radicals, Decomposition, Radiation chemistry

One-hundred-milliliter samples of the storable liquid rocket fuels hydrazine, RP-1, and Hydyne generate, respectively, 89.1, 50.3 and 149.4 ml of radiolytic off-gas (measured at 25C and 1 atm) when irradiated to 86,000,000 rads with gamma rays. When approximately 5 wt-% of an efficient, olefinic, free-radical scavenger is added to the samples, the off-gas volume produced by RP-1 fuel is reduced by 18.7% while those of hydrazine and Hydyne fuels are not reduced. These scavenging effects show that RP-1 fuel decomposes radiolytically by both free-radical (18.7%) and molecular mechanisms, and that hydrazine and Hydyne fuels decompose entirely by a molecular or ionic mechanism. (Author)

AD-632 287 See Fld. 11/9

Field 22-SPACE TECHNOLOGY

22/1. ASTRONAUTICS

AD-632 313 Fld. 22/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE ASSAULT ON OUTER SPACE GOES ON.
29 Apr 66, 7p. Rept. no. FTD-TT-65-1903,
Unclassified report

Unedited rough draft trans. of Tekhnika i Vooruzhenie (USSR) n10 p2-3 1964.

Descriptors: (*Space flight, USSR), (*Spacecraft, USSR), Astronauts

Our socialistic fatherland has gone out to new boundaries in the development of astronautics. A powerful rocket carrier first took out into the endless distances of outer space the multiple-place spaceship, the Voskhod, aboard which there was laboring to accomplish their goal, carrying out a complicated and multilateral program of scientific investigations, a friendly group of astronauts, an engineer, a scientist, and a physician. These researches have uniquely important significance for further long flights of the crews of spaceships. Three in outer space on one ship - such a thing has never happened before. And from the moment when the Voskhod soared upward into the skies and went into its assigned orbit from all corners of our planet there flowed in greetings addressed to the Soviet people and its glorious sons, V. M. Komarov, K. P. Feoktistov, and B. B. Yegorov. The Soviet Union in opening up a new era in the history of mankind maintains the primacy, true to natural law, in the exploration and conquest of outer space. For this serious affair proves to be a component part of that gigantic creative work which the Soviet people is carrying on in accordance with the general line of the Communist party in all branches of economy, science, and culture in the name of mankind for the benefit of mankind.

AD-631 989 See Fld. 6/18

AD-632 203 See Fld. 22/2

22/2. SPACECRAFT

AD-631 942 Fld. 22/2, 12/1, 14/1
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
STATISTICAL ANALYSIS OF SPACECRAFT REPLENISHMENT,
by G. E. Modesitt. Mar 66, 34p. Rept. no. urm-4739-ARPA,
Contract SD-79 ,ARPA Order-189-61
Unclassified report

Descriptors: (*Statistical analysis, Cost effectiveness), (*Spacecraft, Maintenance), Launching, Interplanetary trajectories, Astronautics

This memorandum discusses the number of launches required to establish and maintain a spacecraft system. The mean and dispersion in number of launches are derived for a system consisting of an arbitrary number of exponentially decaying spacecraft and with a constant probability for successful replenishment launches. The report shows the dependence of these results on the spacecraft mean lifetime, the launch success probability, and the number of spacecraft per launch. The results are useful in estimating the probable costs of various spacecraft systems and should be of assistance in comparing such systems. The memorandum was prepared as part of the Advanced Research Projects Agency's VELA Analysis study. An abridged version of this memorandum was published in the Proceedings of the IEEE: Special Issue on Nuclear Test Detection, December 1965.

AD-632 203 Fld. 22/2, 3/1, 22/1
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
MANKIND'S GREAT ACHIEVEMENT FIRST AUTOMATIC LUNAR STATION.
1966, 16p. Rept. no. TC-1005,
TT 66-61193
Unclassified report

Trans. from Pravda, Moscow (USSR) n37 (17354) 6 Feb 1966.

Descriptors: (*Lunar bases, Automatic), (*Lunar probes, *Soft landings), Astronautics, Moon, Exploration, Instrumentation, Astronomy, USSR

The report gives a brief description of the instrumentation, launching, and soft landing of the Soviet Luna-9 moon station.

AD-632 386 Fld. 22/2, 20/13, 20/4
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
CHARACTERISTICS OF FLUID FLOW THROUGH ORIFICES IN ROTATING DISKS.
Master's thesis,
by James William Wold. Mar 66, 65p. Rept. no. GAM/ME/66A-9,
Unclassified report

Descriptors: (*Fluid flow, Orifices), (*Reentry vehicles, Cooling), (*Spacecraft components, Cooling), Disks, Rotation, Gas flow, Air, Water, Thermal radiation

Rotating orifices were investigated recently as a means of cooling the window of a reentry vehicle. Besides intercepting thermal radiation, the rotating disk containing the orifices was believed to have reduced the flow of hot gases through the orifices. The study demonstrated with both air and water and with various disks that the flow rate can be reduced by increasing the orifice tangential speed. The results are presented graphically with the discharge coefficient C shown as a function of a nondimensional velocity parameter S. At zero rotation (S = O) the discharge coefficient with air has values of 0.60 to 0.65, whereas at higher S values the discharge coefficient decreases to a range of 0.08 to 0.18. In the water tests values of S of 8.8 to 9.3 were obtained with corresponding values of C ranging between 0.04 and 0.18. (Author)

AD-632 487 Fld. 22/2, 20/13
CFSTI Prices: HC $2.00 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
THERMAL SIMILARITY STUDY OF A TYPICAL SPACE VEHICLE ELEMENT IN A CONDUCTING AND RADIATING MODE,
by Robert L. Young, and Richard V. Shanklin, III., May 66, 38p. Rept. no. AEDC-TR-66-22, Contract AF 40 (600)-1200,
Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Spacecraft, Thermodynamics), (*Spacecraft components, Models (Simulations)), Space simulation chambers, Thermal analysis, Thermal conductivity, Thermal radiation

Rules of similarity analysis are applied to develop criteria for deducing from model experiments steady-state and transient temperature distributions for a typical space vehicle element exposed to space conditions. The specific purpose is to determine if useful information can be obtained on models in space environment chambers. Thermal similarity criteria are deduced from expressions for transient conduction with radiation boundary conditions. Based on these criteria, a prototype and nominally one-half -scale model were designed and tested in a space chamber. To attain thermal similarity, some geometric distortion was necessary in the model. Both prototype and model were thermally cycled. Temperature data for prototype and model are compared at equivalent locations and times. Results show that temperatures agree within an average of approximately 1 percent with a maximum deviation of approximately 5 percent. The model was subsequently altered, thus destroying its thermal similarity. After alteration, the temperature data differed significantly from that of the thermally similar model and prototype. These experimental results demonstrate the correctness of the derived criteria and show that close adherence to similarity rules is required. (Author)

AD-631 951 **See Fld. 10/3**

AD-632 162 **See Fld. 3/1**

AD-632 237 **See Fld. 17/8**

AD-632 243 **See Fld. 17/2**

AD-632 532 **See Fld. 17/2**

AD-632 547 **See Fld. 4/1**

22/3. SPACECRAFT TRAJECTORIES AND REENTRY

AD-631 849 Fld. 22/3, 17/7
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
NEAR EARTH SATELLITE HANDBOOK DATA,
by John F. Clark. Jun 64, 65p. Rept. no. TG-580,
Contract NOw-62-0604-c,
Unclassified report

Descriptors: (*Satellites (Artificial), Orbital trajectories), (*Satellite tracking systems, Handbooks), (*Position finding, Satellite tracking systems), Curve fitting, Graphics, Celestial mechanics, Astronautics, Navigation

Several parametric graphs have been developed which show the effect of variation in certain aspects of the orbit of a near-earth satellite. The derivation and possible applications of these curves are provided, for the use and understanding of satellite tracking or navigation station operators. (Author)

AD-631 934 Fld. 22/3
CFSTI Prices: HC $3.00 MF $0.75
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES.
SPIN DECAY OF A CLASS OF SATELLITES CAUSED BY SOLAR RADIATION,
by B. Etkin, and P. C. Hughes. Jul 65, 59p.
Rept. no. UTIAS-107,
Contract AF-AFOSR-222-64,
Unclassified report

Descriptors: (*Solar radiation, Aeroelasticity), (*Aeroelasticity, *Satellites (Artificial)), Spacecraft, Orbital trajectories, Spin, Flexible structures, Rods, Satellite antennas, Thermal stresses, Deformation, Drag

A study is presented of the interaction with the solar radiation field of a spinning satellite having long flexible rods. The dynamics of thermal bending of the rods is analyzed, including the effect of vehicle rotation, and the shape, amplitude and phase are calculated. The radiation pressure on the periodically bent rods produces a net average despin torque that depends critically on the phase lag of the thermal bending. The theory is compared with flight data from the Alouette I and S48 satellites, and the agreement indicates that the mechanism studied is the primary cause of despin of these vehicles. A means of preventing despin is proposed. It consists of polished plates mounted on the tips of the rods. The torque produced by the solar pressure acting on them is opposite to that on the rods. The plate area required for complete cancellation of the despin torque is of order 1/4 to 1/2 of the projected rod area. (Author)

AD-632 218 **See Fld. 17/9**

AD-632 533 **See Fld. 16/2**

AD-632 536 **See Fld. 16/2**

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field/group. A typical subject index entry is shown below.

*ALUMINUM
GLASS TEXTILES
INVESTIGATION OF GLASS-
METAL COMPOSITE MATERIALS
AD-619 773 FLD. 11/7

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field/group and titles are also listed. Three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*CHASE, JOHN W.
* * *
THE LANTHANUM, EUROPIUM,
AND DYSPROSIUM CONTENTS OF
TWO TEKTITES
AD-619 828 FLD. 8/7
* * *
A PROCEDURE FOR GEOCHEMICAL
INTERPRETATION OF TERRESTRIAL
RARE-EARTH ABUNDANCE PATTERNS
AD-619 834 FLD. 8/7

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry for each document are listed the originator of the report, the originator's report number, the title, AD number, and field/group. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parenthesis directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

*AEROJET- GENERAL CORP AZUSA
CALIF

* * *

TR3015
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
(AFOSR 65-1058)
AD-619 513 FLD. 7/4

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH WASHINGTON D C

* * *

65-1058
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
AD-619 513 FLD. 7/4

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field/group.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 5167
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-65-315)
AD-619 580 FLD. 9/5
(ESD TDR-65-309)
AD-619 708 FLD. 3/1

REPORT NUMBER INDEX

The Report Number Index lists identifying numbers assigned either by the document originators or by the sponsors of the work described in the documents. The AD number and field/group location in TAB are given for each report number. If both the originator and the sponsor of a document have assigned identifying numbers, listings for both will appear in the respective alphanumeric positions.

In certain cases accession numbers are also given with the corresponding AD numbers and TAB locations; for instance, the IDEP (Interservice Data Exchange Program) reports and the CFSTI-TT reports (Technical Translations from the Clearinghouse for Federal Scientific and Technical Information).

CCL-183	
AD-620 154	FLD. 11/9
CRSR-203	
AD-620 250	FLD. 3/1
DPS-1677	
AD-469 558	FLD. 19/1A

AD-FIELD INDEX

The AD-Field Index is arranged numerically by AD number and lists the field/group where the full entry can be located in TAB.

SUBJECT INDEX

The fields/groups indicated here apply only to the Technical Abstract Bulletin Section (on white paper).

•ABLATION
MATERIALS
INSULATIVE PERFORMANCE OF SELECTED ABLATIVE MATERIALS IN A LOW ENTHALPY HYPERSONIC AIRSTREAM,•
AD-632 914 FLD. 11/12

•ABSORPTION SPECTRUM
ZINC COMPOUNDS
REPRINT: ZEEMAN EFFECTS IN THE EDGE EMISSION AND ABSORPTION OF ZNO.
AD-632 930 FLD. 20/12

•ACCELERATION TOLERANCE
AVIATION MEDICINE
BODY SUSCEPTIBILITY TO HIGH ACCELERATIONS AND TO ZERO GRAVITY CONDITION.
AD-631 880 FLD. 6/19

BRAIN
REPRINT: DETERMINATION OF THE THRESHOLD OF THE CEREBELLAR ROTARY RESPONSE IN THE FLOCCULUS NODULE OF THE CURARIZED CAT.
AD-631 881 FLD. 6/16

PIGEONS
REPRINT: ROTARY AND POST-ROTARY CEREBELLAR RESPONSE AND NYSTAGMUS OF THE NAPE OF THE NECK IN THE PIGEON.
AD-631 883 FLD. 6/16
REPRINT: (CEREBELLAR THRESHOLD OF ROTARY ACCELERATION AND TEMPORAL SUMMATION IN THE CARRIER PIGEON).
AD-631 884 FLD. 6/16

RESPIRATION
REPRINT: PULMONARY GAS EXCHANGE IN MAN AS AFFECTED BY PROLONGED GRAVITATIONAL STRESS.
AD-632 627 FLD. 6/19

•ACETATES
PYROLYSIS
REPRINT: PYROLYSIS OF SEC-BUTYL ACETATE. STEREOSPECIFIC CIS ELIMINATION.
AD-632 219 FLD. 7/3

•ACETYLCHOLINE
BLATTIDAE
REPRINT: THE EFFECT OF ACETYLCHOLINE, GLUTAMIC ACID AND GABA ON THE CONTRACTIONS OF THE PERFUSED COCKROACH LEG.
AD-632 191 FLD. 6/16

NERVE CELLS
REPRINT: CHOLINERGIC TRANSMISSION MECHANISMS FOR BOTH EXCITATION AND INHIBITION IN MOLLUSCAN CENTRAL SYNAPSES.
AD-632 612 FLD. 6/16

SECRETION
REPRINT: THE EFFECTS OF CHLORINE AND OTHER FACTORS ON THE RELEASE OF ACETYLCHOLINE FROM THE STIMULATED PERFUSED SUPERIOR CERVICAL GANGLION OF THE CAT.
AD-631 885 FLD. 6/16

SENSITIVITY
REPRINT: NERVOUS CONTROL OF CHEMOSENSITIVITY IN MUSCLE.
AD-632 099 FLD. 6/16

•ACOUSTIC IMPEDANCE
UNDERWATER SOUND
ANALYSIS OF ACOUSTIC IMPEDANCE DATA.•
AD-632 079 FLD. 20/1

•ACOUSTICS
FOCUSING
ON THE FREQUENCY OF RETURNING ACOUSTIC RAYS AND FOCUSING FOR HUNTSVILLE AND MISSISSIPPI TEST FACILITY.•
AD-632 607 FLD. 20/1

GAS FLOW
WEAKLY-RADIATIVE ACOUSTIC FLOW INDUCED BY RADIATION FROM A STATIONARY WALL,•
AD-631 945 FLD. 20/1

SOIL MECHANICS
ONE-DIMENSIONAL STRESS WAVE PROPAGATION IN SOILS.•
AD-632 106 FLD. 8/13

UNDERWATER
A REVIEW OF FLOW NOISE RESEARCH RELATED TO THE SONAR SELF NOISE PROBLEM.•
AD-632 009 FLD. 17/1

UNDERWATER SOUND
PRECISION SOUND VELOCITY PROFILES IN THE OCEAN. VOLUME I. THE SOUND CHANNEL IN THE BERMUDA-BARBADOS REGION. NOVEMBER-DECEMBER 1963.•
AD-632 099 FLD. 20/1
REPRINT: NOISE COVARIANCE AND VERTICAL DIRECTIVITY IN A DEEP OCEAN.
AD-632 471 FLD. 20/1

•ACRYLIC RESINS
VARNISHES
SPECIFICATION FOR AML 95K ALL-ACRYLIC LACQUER.•
AD-632 238 FLD. 11/3

•ACTUATORS
PARACHUTES
HIGH-ALTITUDE DELAYED-OPENING PARACHUTE ACTUATING DEVICE: DESIGN AND PERFORMANCE.
AD-632 572 FLD. 1/3

•ADENOSINE PHOSPHATES
NERVE CELLS
BIOCHEMICAL PROPERTIES OF SQUID AXON MEMBRANES.
AD-632 267 FLD. 6/1

•ADJUSTMENT(PSYCHOLOGY)
ANTARCTIC REGIONS
ADAPTATION TO EXTREME ENVIRONMENTS: THE ANTARCTIC VOLUNTEER.•
AD-632 971 FLD. 5/10

•AERODYNAMICS
RAMJET INLETS
RAMJET TECHNOLOGY. SECTION ON FLOW PROCESSES AND ENGINE PERFORMANCE. CHAPTER 3B. SUPERSONIC INLETS.•
AD-631 872 FLD. 21/5

•AEROELASTICITY
SATELLITES(ARTIFICIAL)
SPIN DECAY OF A CLASS OF SATELLITES CAUSED BY SOLAR RADIATION.•
AD-631 934 FLD. 22/3

•AERONAUTICS
USSR
TRANSLATION OF RUSSIAN RESEARCH: TECHNICAL-ECONOMIC PROBLEMS OF AIR TRANSPORT.
AD-632 469 FLD. 1/2

•AEROSOL GENERATORS
LIQUID JETS
INVESTIGATION OF THE COALESCENCE OF WATER DROPS.•
AD-632 915 FLD. 20/4

•AEROSOLS
SAMPLERS
ELECTRICALLY OPERATED IMPACTORS FOR HYDROMETEOR SAMPLING.•
AD-631 950 FLD. 4/2

•AIR
HEAT TRANSFER
THE EFFECT OF LONGITUDINAL VIBRATIONS ON HEAT TRANSFER BY FREE CONVECTION IN AIR, WATER, AND A VISCOUS HYDROCARBON POLYMER.•
AD-632 395 FLD. 20/13

PHOTOCHEMISTRY
SOME EXPLORATORY EXPERIMENTS ON LASER EXPLOSIONS IN PSEUDO-AIR.•
AD-632 989 FLD. 7/3

•AIR DROP OPERATIONS
PARACHUTE DESCENTS
HIGH-ALTITUDE DELAYED-OPENING PARACHUTE ACTUATING DEVICE: DESIGN AND PERFORMANCE.
AD-632 572 FLD. 1/3

•AIR FORCE PERSONNEL
APTITUDE TESTS
ESTIMATING READING ABILITY LEVEL FROM THE AQE GENERAL APTITUDE INDEX.•
AD-632 182 FLD. 5/9

•AIR TRANSPORTATION
USSR
TRANSLATION OF RUSSIAN RESEARCH: TECHNICAL-ECONOMIC PROBLEMS OF AIR TRANSPORT.
AD-632 469 FLD. 1/2

•AIRCRAFT
COMPOSITE MATERIALS
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*LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y

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•MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

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•MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CIVIL ENGINEERING

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•MATERIALS SCIENCE CENTER CORNELL UNIV ITHACA N Y

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•MAX-PLANCK-INSTITUT FUER BIOLOGIE TUEBINGEN (WEST GERMANY)

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*MCCRONE (WALTER C) ASSOCIATES INC CHICAGO ILL

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*MEDICAL RESEARCH COUNCIL OXFORD (ENGLAND) CELL METABOLISM RESEARCH UNIT

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•ROYAL INST OF TECH STOCKHOLM (SWEDEN) DEPT OF PHYSICS

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SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
AD-632 906 FLD. 6/16
AD-632 984 FLD. 6/5
AD-632 635 FLD. 6/16
AD-632 636 FLD. 6/16
AD-632 637 FLD. 6/16
AD-632 638 FLD. 6/16
AD-632 639 FLD. 6/16
AD-632 640 FLD. 6/16
AD-632 641 FLD. 6/16
AD-632 642 FLD. 6/16
AD-632 643 FLD. 6/16
AD-632 644 FLD. 6/16
AD-632 645 FLD. 6/16
AD-632 646 FLD. 6/16
AD-632 647 FLD. 6/16
AD-632 648 FLD. 6/16
AD-632 650 FLD. 6/16

•AF 61(052)-256
UNIVERSITY COLL LONDON (ENGLAND)
(AFOSR-2989)
AD-632 045 FLD. 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
(AFOSR-2991)
AD-632 046 FLD. 6/3
(AFOSR-2990)
AD-632 047 FLD. 6/3
(AFOSR-2988)
AD-632 048 FLD. 6/3
(AFOSR-2992)
AD-632 190 FLD. 6/3

•AF 61(052)-268
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
F AD-632 908 FLD. 6/1
AD-632 691 FLD. 7/4

•AF 61(052)-270
AGRICULTURAL UNIV WAGENINGEN (NETHERLANDS)
(AFOSR-4183)
AD-632 079 FLD. 6/13

•AF 61(052)-272
EDINBURGH UNIV (SCOTLAND) DEPT OF PHYSIOLOGY
AD-632 653 FLD. 6/16
AD-632 654 FLD. 6/16
AD-632 655 FLD. 6/16

•AF 61(052)-301
CAMBRIDGE UNIV (ENGLAND)
F AD-632 307 FLD. 6/16
(AFOSR-4277)
AD-632 922 FLD. 6/16
(AFOSR-2909)
AD-632 950 FLD. 6/16

•AF 61(052)-400
MANCHESTER UNIV (ENGLAND) DEPT OF ASTRONOMY
(AFCRL-66-297)
F AD-632 131 FLD. 3/2

•AF 61(052)-587
LIEGE UNIV (BELGIUM) DEPT OF ASTROPHYSICS
TN-11
(AFCRL-66-220)
AD-632 129 FLD. 9/1

•AF 61(052)-595
JOHANNES GUTENBERG UNIVERSITAET MAINZ (WEST GERMANY)
METEOROLOGISCH- GEOPHYSIKALISCHES INSTITUT
SCIENTIFIC-4
(AFCRL-66-212)
AD-632 343 FLD. 4/1

•AF 61(052)-678
KIRUNA GEOPHYSICAL OBSERVATORY (SWEDEN)
SCIENTIFIC-11
(AFCRL-66-223)
AD-632 269 FLD. 4/1

•AF 61(052)-743
OSLO UNIV (NORWAY) DEPT OF ASTROPHYSICS
SCIENTIFIC-11
(AFCRL-65-258)
AD-632 171 FLD. 3/2
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
SCIENTIFIC-6
(AFCRL-66-219)
AD-632 166 FLD. 3/2
SCIENTIFIC-2
(AFCRL-66-215)
AD-632 167 FLD. 3/2
SCIENTIFIC-3
(AFCRL-66-216)
AD-632 168 FLD. 20/6
SCIENTIFIC-4
(AFCRL-66-217)
AD-632 169 FLD. 20/6
SCIENTIFIC-5
(AFCRL-66-218)
AD-632 170 FLD. 3/2

•AF 61(052)-762
ROYAL INST OF TECH STOCKHOLM (SWEDEN) DEPT OF PHYSICS
SCIENTIFIC-5
(AFCRL-66-295)
AD-632 559 FLD. 7/4

•AF 61(052)-776
LOUVAIN UNIV (BELGIUM)
(RADC-TR-66-176)
F AD-632 957 FLD. 20/3

•AF 61(052)-784
ZURICH UNIV (SWITZERLAND) DEPT OF ANATOMY
(AMRL-TR-65-66)
F AD-632 296 FLD. 6/20

•AF 61(052)-789
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE
(AFCRL-66-221)
A AD-632 145 FLD. 20/12

•AF 61(052)-811
NORWEGIAN INST OF COSMIC PHYSICS UNIV OF OSLO
SCIENTIFIC-4
(AFCRL-66-260)
AD-632 299 FLD. 20/14

•AF 61(052)-838
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
(AFCRL-66-261)
A AD-632 130 FLD. 7/4

•AF 61(052)-850
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
(SAM-TR-66-14)
AD-632 500 FLD. 6/16

•AF 61(052)-851
ISTITUTO UNIVERSITARIO NAVALE NAPLES (ITALY)
(AFCRL-66-214)
A AD-632 275 FLD. 20/14

•AF 61(052)-852
UNIVERSITY COLL DUBLIN (IRELAND) UNIT OF CELL METABOLISM
(AFOSR-66-0717)
F AD-632 305 FLD. 6/1

•AF 61(052)-899
ROYAL INST OF TECH STOCKHOLM (SWEDEN) MICROWAVE DEPT
(RADC-TR-66-186)
AD-631 893 FLD. 20/9
(RADC-TR-66-187)
AD-631 894 FLD. 20/9
SCIENTIFIC-3
(RADC-TR-66-188)
AD-631 895 FLD. 20/12
SCIENTIFIC-4
(RADC-TR-66-189)
AD-631 896 FLD. 20/9
(RADC-TR-66-304)
AD-632 941 FLD. 20/9

•AF 61(052)-1006
HEIDELBERG UNIV (WEST GERMANY) PHARMAKOLOGISCHES INSTITUT
AD-632 149 FLD. 6/15

•AF 61(514)-634
ISTITUTO NAZIONALE DI OTTICA FLORENCE (ITALY)
AD-631 901 FLD. 6/16
AD-631 902 FLD. 6/16

•AF 61(514)-858
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
AD-632 692 FLD. 6/1

•AF 61(514)-861
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF MEDICAL PHYSICS
TN-5
AD-631 903 FLD. 14/4
TN-1
AD-631 904 FLD. 6/1
TN-2
AD-631 905 FLD. 6/5
TN-4
AD-631 906 FLD. 14/4
AD-631 907 FLD. 14/4
TN-3
AD-631 908 FLD. 6/13
F AD-632 301 FLD. 6/16

•AF61(514)-990
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
AD-632 692 FLD. 6/1

•AF 61(514)-995
DEUTSCHE FORSCHUNGSANSTALT FUER PSYCHIATRIE (MAX-PLANCK-INSTITUT) MUNICH (WEST GERMANY)
F AD-631 922 FLD. 6/20

•AF 61(514)-1112
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE PATHOLOGIE GENERALE
AD-632 614 FLD. 6/16
AD-632 615 FLD. 6/16

•AF 61(514)-1129
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
(AFOSR-TN-59-827)
AD-631 909 FLD. 6/16
(AFOSR-TN-59-386)
AD-631 910 FLD. 6/16
(AFOSR-TN-59-832)
AD-631 911 FLD. 6/16
(AFOSR-TN-59-829)
AD-631 912 FLD. 6/16
(AFOSR-TN-59-830)
AD-631 913 FLD. 6/16
(AFOSR-TN-59-387)
AD-631 914 FLD. 6/16
AD-631 915 FLD. 6/16
AD-631 932 FLD. 6/16

•AF 61(514)-1127
OSLO UNIV (NORWAY) NEUROPHYSIOLOGICAL LAB
(AFOSR-2030)
AD-631 916 FLD. 6/16
F AD-631 917 FLD. 6/16

•AF 61(514)-1175
LIEGE UNIV (BELGIUM) INSTITUT DE THERAPEUTIQUE EXPERIMENTALE
(AFOSR-TN-59-636)
AD-631 926 FLD. 6/5
AD-632 691 FLD. 7/4

•AF 61(514)-1268
GOETTINGEN UNIV (WEST GERMANY) PHYSIOLOGICAL INST
F AD-631 921 FLD. 6/16

•AF 62(091)-293
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
AD-632 649 FLD. 6/16

•AF-AFOSR-29-65
NEW YORK UNIV N Y LAB FOR ELECTROSCIENCE RESEARCH
(AFOSR-66-0776)
F AD-632 365 FLD. 12/2

•AF-AFOSR-62-20
CAMBRIDGE UNIV (ENGLAND) PSYCHOLOGICAL LAB
AD-632 629 FLD. 5/10

•AF-AFOSR-62-93
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
(AFOSR-66-0587)
AD-632 328 FLD. 7/4
(AFOSR-66-0583)
AD-632 588 FLD. 7/3
(AFOSR-66-0913)
AD-632 589 FLD. 7/3

•AF-AFOSR-62-109
TEXAS UNIV AUSTIN DEPT OF CHEMISTRY
(AFOSR-66-0714)
F AD-632 268 FLD. 7/3

•AF-AFOSR-62-261
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF MATHEMATICS
(AFOSR-65-0355)
AD-632 590 FLD. 12/1

•AF-AFOSR-62-268
UTAH STATE UNIV LOGAN DEPT OF CHEMISTRY
(AFOSR-66-0567)
AD-632 591 FLD. 7/3

•AF-AFOSR-129-64
CALIFORNIA UNIV BERKELEY
(AFOSR-66-0064)
AD-632 323 FLD. 20/4

•AF-AFOSR-129-65
CALIFORNIA UNIV BERKELEY
(AFOSR-66-0777)
F AD-632 575 FLD. 21/2

•AF-AFOSR-139-65
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-65-30
AD-632 067 FLD. 9/3

•AF-AFOSR-148-63
KANSAS STATE UNIV MANHATTAN DEPT OF CHEMISTRY
(AFOSR-66-0687)
AD-632 327 FLD. 7/3

•AF-AFOSR-222-64
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-107
AD-631 934 FLD. 22/3

•AF-AFOSR-369-65
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-91
(AFOSR-66-0002)
AD-631 933 FLD. 14/2

•AF-AFOSR-476-64
UTAH UNIV SALT LAKE CITY DEPT OF CHEMISTRY
(AFOSR-66-0679)
AD-632 322 FLD. 7/4

•AF-AFOSR-513K64
CARNEGIE INST OF TECH PITTSBURGH PA
(AFOSR-66-0727)
F AD-632 963 FLD. 7/3

•AF-AFOSR-528-64
TEXAS UNIV AUSTIN DEPT OF CHEMISTRY
(AFOSR-66-0714)
F AD-632 268 FLD. 7/3

•AF-AFOSR-623-64
WISCONSIN UNIV MADISON DEPT OF CHEMISTRY
(AFOSR-0728)
F AD-632 464 FLD. 7/3

•AF-AFOSR-639-65
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-65-30
AD-632 067 FLD. 9/3

•AF-AFOSR-647-64
CARNEGIE INST OF TECH PITTSBURGH PA
(AFOSR-66-0722)
AD-632 330 FLD. 12/1

•AF-AFOSR-693-64
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
(AROD-5149:2)
AD-632 292 FLD. 12/2

•AF-AFOSR-753-65
PURDUE UNIV LAFAYETTE IND SCHOOL OF MECHANICAL ENGINEERING
(AFOSR-66-0696)
AD-632 087 FLD. 21/8

•AF-AFOSR-781-65
CHICAGO UNIV ILL
(AFOSR-66-0680)
AD-632 329 FLD. 7/4

•AF-AFOSR-783-65
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
(AFOSR-66-0715)
F AD-632 266 FLD. 9/1

•AF-AFOSR-788-65
CHILE UNIV SANTIAGO LABORATORIO DE BIOFISICA
(AFOSR-66-0716)
AD-632 267 FLD. 6/1

•AF-AFOSR-804-65
ILLINOIS UNIV URBANA
(AFOSR-66-0719)
F AD-632 306 FLD. 20/5

•AF-AFOSR-939-65
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING
(AFOSR-66-0835)
AD-632 576 FLD. 9/2

•AF-AFOSR-1033-66
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
(AFOSR-66-0989)
AD-632 333 FLD. 20/6

•AF-EOAR-22-64
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
SCIENTIFIC-2
(AFOSR-66-0721)
AD-632 026 FLD. 6/5
AD-632 326 FLD. 6/5
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) SECTION OF CHEMICAL IMMUNOLOGY
AD-632 324 FLD. 6/5
AD-632 325 FLD. 6/5
AD-632 331 FLD. 6/5

•AF-EOAR-29-63
PISA UNIV (ITALY)
(AFOSR-66-0256)
AD-632 322 FLD. 12/1

•AF-EOAR-32-64
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS
33
(AFOSR-66-0699)
AD-632 449 FLD. 20/10
31
(AFOSR-66-0700)
AD-632 450 FLD. 17/7

•AF-EOAR-42-65
PISA UNIV (ITALY)
(AFOSR-66-0296)
AD-632 322 FLD. 12/1

•AF-EOAR-43-65
DARTMOUTH COLL HANOVER N H
(AFOSR-66-0391)
AD-632 447 FLD. 20/4

•AF-EOAR-52-65
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
(AFOSR-66-0718)
F AD-632 113 FLD. 6/15

•AF-EOAR-55-65
CAJAL INST MADRID (SPAIN) DEPT OF BIOPHYSICS
211
(AFOSR-66-0713)
F AD-632 269 FLD. 6/16

•AF-EOAR-58-63
TECHNION - ISRAEL INST OF TECH HAIFA
AD-632 446 FLD. 20/11

•AF-EOAR-61-4
UNIVERSITY COLL CORK (EIRE)
AD-632 221 FLD. 20/11

•AF-EOAR-62-61
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
AD-632 452 FLD. 20/11

•AF-EOAR-63-47
LABORATOIRE DE PHYSIQUE THEORIQUE ET HAUTES ENERGIES ORSAY (FRANCE)
(AFOSR-65-0831)
AD-632 222 FLD. 20/4

•AF-EOAR-64-5
LUND UNIV (SWEDEN)
(AFOSR-66-0711)
F AD-632 127 FLD. 6/1

•AF-EOAR-79-64
NEWCASTLE-UPON-TYNE UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY
(AFOSR-66-0312)
AD-632 448 FLD. 7/2

•AF-EOAR-84-65
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF PHYSICS
(AFOSR-66-0396)
AD-632 445 FLD. 7/4

•AF-EOAR-116-63
SASSARI UNIV (ITALY) FACULTY OF SCIENCES
(AFCRL-66-296)
F AD-632 293 FLD. 6/16

•ARPA ORDER-70
NAVAL RESEARCH LAB WASHINGTON D C
NRL-MR-1677
AD-631 957 FLD. 14/2

•ARPA ORDER-180-62
RHODE ISLAND UNIV KINGSTON
AD-632 172 FLD. 8/11

•ARPA ORDER-189-61
RAND CORP SANTA MONICA CALIF
URM-4739-ARPA
AD-631 992 FLD. 22/2
RM-4290-ARPA
AD-632 534 FLD. 18/11

•ARPA ORDER-299
AMERICAN CYANAMID CO STAMFORD CONN CENTRAL RESEARCH DIV
06-1492-26-911
AD-632 220 FLD. 7/5

•ARPA ORDER-306
KORAD CORP SANTA MONICA CALIF
AD-632 024 FLD. 20/5
PHILCO BLUE BELL PA APPLIED RESEARCH LAB
A056-F
F AD-632 022 FLD. 20/5

•ARPA ORDER-306-62
KANSAS STATE UNIV MANHATTAN
F AD-632 014 FLD. 20/6
LENINGRAD POLYTECHNICAL INST KALININ (USSR)
F AD-632 007 FLD. 20/5

•ARPA ORDER-396
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
TR-377
AD-632 440 FLD. 20/4
TR-581
AD-632 536 FLD. 16/2

•ARPA ORDER-512
LINCOLN LAB MASS INST OF TECH LEXINGTON
JA-2643
(ESD-TDR-66-53)
AD-632 146 FLD. 8/11
JA-2651
(ESD-TDR-66-55)
AD-632 150 FLD. 8/11

•ARPA ORDER-529
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
PIBMRI-1295.2-66
S AD-631 859 FLD. 20/5

•ARPA ORDER-620
COAST AND GEODETIC SURVEY WASHINGTON D C
F AD-631 939 FLD. 8/11

•AT(11-1)-1198
ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB
COO-1198-365
AD-632 577 FLD. 14/2

•AT(11-1)-GEN-10
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
66-20
AD-632 230 FLD. 9/5

•AT(49-7)-1969
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
USNRDL-TR-991
AD-632 256 FLD. 18/8

•CDM-SR-CO-37
STANFORD RESEARCH INST MENLO PARK CALIF
AD-632 560 FLD. 15/5

•DA-01-021-AMC-242(Z)
GENERAL ELECTRIC CO HUNTSVILLE ALA COMPUTER DEPT
(RSIC-541)
AD-632 208 FLD. 9/2

•DA-11-022-ORD-4090
MCCRONE (WALTER C) ASSOCIATES INC CHICAGO ILL
AD-632 564 FLD. 20/2

•DA-11-190-ENG-92
COLORADO SCHOOL OF MINES RESEARCH FOUNDATION INC GOLDEN
(CRREL-TR-122)
F AD-632 198 FLD. 13/13

•DA-18-035-AMC-274(A)

BROWN UNIV PROVIDENCE R I
AD-632 593 FLD. 7/3

•DA-19-020-ORD-5351
COMBAT OPERATIONS RESEARCH GROUP TECHNICAL OPERATIONS INC FORT BELVOIR VA
CORG-M-159
AD-632 017 FLD. 5/2
CORG-M-172
AD-632 068 FLD. 15/5

•DA-19-129-AMC-84(N)
FMC CORP SANTA CLARA CALIF CENTRAL ENGINEERING LABS
(ANL-TR-66-28-FD)
F AD-632 311 FLD. 6/8

•DA-19-129-AMC-142(N)
GENERAL FOODS CORP WHITE PLAINS N Y•
(USA-NLABS-TR-66-32-FD)
F AD-632 380 FLD. 6/8

•DA-19-129-AMC-187(N)
ADAMS (CHARLES W) ASSOCIATES INC BEDFORD MASS
(USA-NLABS-TR-66-22-FD)
F AD-632 981 FLD. 9/2

•DA-19-129-AMC-302(N)
NORTHEASTERN UNIV BOSTON MASS
(USA-NLABS-FD-93)
F AD-631 995 FLD. 6/1

•DA-19-129-AMC-789(N)
DENVER UNIV COLO DEPT OF GEOGRAPHY
PUBS. IN GEOGRAPHY-66-1
F AD-632 586 FLD. 8/6

•DA-19-129-QM-1970
PILLSBURY MILLS INC MINNEAPOLIS MINN
(USA-NLABS-FD-39)
F AD-631 996 FLD. 6/8

•DA-22-079-ENG-330
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CIVIL ENGINEERING
R65-47
(AEWES-CR-3-101)
AD-632 061 FLD. 8/13

•DA-22-079-ENG-427
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CIVIL ENGINEERING
RR-R65-46
(AEWES-CR-3-129-1)
AD-632 394 FLD. 8/13

•DA-28-043-AMC-00013(E)
MICHIGAN UNIV ANN ARBOR RADAR AND OPTICS LAB
6400-91-T
AD-632 012 FLD. 9/5

•DA-28-043-AMC-00073(E)
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
R-287
AD-632 569 FLD. 5/7
R-285
AD-632 574 FLD. 9/4
R-286
F AD-632 596 FLD. 14/2

•DA-28-043-AMC-00284(E)
ELECTRONIC FILMS INC BURLINGTON MASS
(ECOM-00284-F)
F AD-632 420 FLD. 9/1

•DA-28-043-AMC-00406(E)
METEOROLOGY RESEARCH INC ALTADENA CALIF
(ECOM-00406-F)
F AD-632 016 FLD. 4/2

•DA-28-043-AMC-00497(E)
AEROJET-GENERAL CORP DOWNEY CALIF
(ECOM-TR-00497-2)
F AD-632 415 FLD. 20/4

•DA-28-043-AMC-01219(E)
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
7469-211
(ECOM-01219-F)
F AD-632 961 FLD. 4/2

•DA-28-043-AMC-01230(E)
RADIO CORP OF AMERICA CAMDEN N J DEFENSE ELECTRONIC PRODUCTS
CR-65-419-32
(ECOM-01230-3)
AD-632 141 FLD. 9/1

•DA-28-043-AMC-01304(E)
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB
(ECOM-01304-3)
AD-631 987 FLD. 7/2

•DA-28-043-AMC-01376(E)
ASTRO-ELECTRONICS DIV RADIO CORP OF AMERICA PRINCETON N J
AD-632 100 FLD. 20/5

•DA-28-043-AMC-01439(E)
HUGHES AIRCRAFT CO FULLERTON CALIF
FR-66-11-119
(ECOM-01439-2)
AD-632 339 FLD. 9/1
(ECOM-01439-1)
AD-632 390 FLD. 9/1

•DA-28-043-AMC-01788(E)
RENSSELAER POLYTECHNIC INST TROY N Y
(ECOM-01788-1)
AD-632 458 FLD. 20/12

•DA-31-124-ARO(D)-46
HYNES CHEMICAL RESEARCH CORP DURHAM N C
(AROD-3802:6)
AD-632 068 FLD. 7/2

•DA-31-124-ARO(D)-84
RCA LABS PRINCETON N J
(AROD-4017:11)
F AD-631 959 FLD. 20/3

•DA-31-124-ARO(D)-92
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
TR-3
AD-631 998 FLD. 20/12

•DA-31-124-ARO(D)-95
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y
(AROD-4074:1)
AD-632 039 FLD. 20/2
(AROD-4074:6)
AD-632 040 FLD. 11/6

•DA-31-124-ARO(D)-101
PENNSYLVANIA UNIV PHILADELPHIA
(AROD-4278:3)
AD-632 053 FLD. 7/3

•DA-31-124-ARO(D)-119
ILLINOIS UNIV URBANA DEPT OF PHYSICS
(AROD-431:70)
AD-632 038 FLD. 7/4

•DA-31-124-ARO(D)-131
CARNEGIE INST OF TECH PITTSBURGH PA
(AROD-3397:11)
AD-632 223 FLD. 20/12

•DA-31-124-ARO(D)-139
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
(AROD-4449:42)
AD-632 056 FLD. 20/5
(AROD-4449:37)
AD-632 057 FLD. 20/13
(AROD-4449:39)
AD-632 058 FLD. 7/5
(AROD-4449:40)
AD-632 059 FLD. 7/4
(AROD-449:36)
AD-632 212 FLD. 7/4
(AROD-4449:43)
AD-632 321 FLD. 20/4

•DA-31-124-ARO(D)-143
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AROD-4266:3)
AD-632 041 FLD. 11/8

•DA-31-124-ARO(D)-146
UNITED AIRCRAFT CORP EAST HARTFORD CONN
(AROD-4367:4)
AD-632 037 FLD. 20/11

•DA-31-124-ARO(D)-151
STANFORD UNIV CALIF DEPT OF MATHEMATICS
(AROD-4323:3)
AD-632 269 FLD. 12/1

•DA-31-124-ARO(D)-270
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
(AROD-5145:2)
AD-632 292 FLD. 12/2

•DA-31-124-ARO(D)-277
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF ENGINEERING RESEARCH
(AROD-5010:8)
AD-632 042 FLD. 11/6

•DA-31-124-ARO(D)-285
STANFORD UNIV CALIF DEPT OF CHEMISTRY
(AROD-5227:1)
AD-632 213 FLD. 7/3

•DA-31-124-ARO(D)-288
ILLINOIS UNIV URBANA
(AROD-5254:8)
AD-632 019 FLD. 12/2

•DA-31-124-ARO(D)-295
IOWA UNIV IOWA CITY DEPT OF CHEMISTRY
(AROD-5199:1)
AD-632 262 FLD. 7/3

•DA-31-124-ARO(D)-303
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
(AROD-4895:4)
AD-632 214 FLD. 7/3
(AROD-4895:5)
AD-632 215 FLD. 7/3
(AROD-4895:8)
AD-632 216 FLD. 7/3
(AROD-4895:7)
AD-632 217 FLD. 7/3

•DA-31-124-ARO(D)-306
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
(AROD-5314:6)
AD-632 066 FLD. 7/5

•DA-31-124-ARO(D)-322
NORTHWESTERN UNIV EVANSTON ILL TECHNOLOGICAL INST
SYSTEMS RESEARCH MEMO-149
AD-631 929 FLD. 12/2
SRM-139
AD-632 107 FLD. 12/2

•DA-31-124-ARO-D-331
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ORC-66-8
(AROD-5307:10)
AD-632 209 FLD. 6/13

•DA-31-124-ARO(D)-369
NORTHWESTERN UNIV EVANSTON ILL
(AROD-9527:3)
AD-632 288 FLD. 20/11

•DA-36-039-ORD-2297
PRINCETON UNIV N J STATISTICAL TECHNIQUES RESEARCH GROUP
(AROD-1715:68)
AD-632 044 FLD. 12/1

•DA-36-039-ORD-3471
RIAS INC BALTIMORE MD
(AROD-2603:19)
AD-632 043 FLD. 12/1

•DA-36-038-AMC-2723(A)
LEHIGH UNIV BETHLEHEM PA INST OF RESEARCH
AD-632 081 FLD. 11/6

•DA-36-039-AMC-01473(E)
API INSTRUMENTS CO CHESTERLAND OHIO
AD-632 455 FLD. 14/2

•DA-36-039-AMC-01478(E)
CORNELL-DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO
NORWOOD MASS
AD-632 229 FLD. 9/1

•DA-36-039-AMC-02321(E)
WATKINS-JOHNSON CO PALO ALTO CALIF
(ECOM-02321-F)
F AD-632 133 FLD. 9/1

•DA-36-039-AMC-02369(E)
ELCON LAB INC PEABODY MASS
R-3-66-1
(ECOM-02369-F)
F AD-632 344 FLD. 17/9

•DA-36-039-AMC-02372(E)
UTAH UNIV SALT LAKE CITY MICROWAVE DEVICE AND PHYSICAL ELECTRONICS LAB
(ECOM-02372-F)
F AD-632 186 FLD. 9/5

•DA-36-039-AMC-03247(E)
STANFORD RESEARCH INST MENLO PARK CALIF
(ECOM-03247-F)
F AD-632 563 FLD. 9/2

•DA-36-039-AMC-03622(E)
GENERAL INSTRUMENT CORP DARLINGTON S C CAPACITOR DIV
AD-632 079 FLD. 9/1

•DA-36-039-AMC-03636(E)
PIEZO TECHNOLOGY INC ORLANDO FLA
AD-632 421 FLD. 9/1

•DA-36-039-AMC-03739(E)
SPERRY ELECTRONIC TUBE DIV SPERRY RAND CORP GAINESVILLE FLA
NJ-2769-0167-8
(ECOM-03739-F)
F AD-632 362 FLD. 11/1

•DA-36-039-AMC-06160(E)
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR-COMPONENTS DIV
03-66-28
AD-632 363 FLD. 9/1

•DA-36-039-SC-86791
AEROPROJECTS INC WEST CHESTER PA
AD-632 364 FLD. 13/8

•DA-36-039-SC-89168
COOLEY ELECTRONICS LAB UNIV OF MICHIGAN ANN ARBOR
TR-174
F AD-632 102 FLD. 17/2.1

•DA-36-039-SC-89219
POLYTECHNIC INST OF BROOKLYN N Y MICROWAVE RESEARCH INST
PIBMRI-1284.1-65
AD-632 423 FLD. 9/4

•DA-44-009-AMC-469(T)
PENNSYLVANIA UNIV PHILADELPHIA ELECTRO-CHEMISTRY LAB
AD-632 319 FLD. 10/2

•DA-44-009-AMC-897(T)
AMERICAN CYANAMID CO STAMFORD CONN CENTRAL RESEARCH DIV
AD-632 931 FLD. 10/2

•DA-44-009-ENG-3687
LYCOMING DIV AVCO CORP WILLIAMSPORT PA
2094
AD-632 392 FLD. 21/7

•DA-44-177-AMC-91(T)
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-889
AD-631 873 FLD. 20/4

•DA-44-177-AMC-254(T)
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ
AVSER-65-13
(USAAVLABS-TR-66-27)
F AD-632 457 FLD. 6/12

•DA-44-177-AMC-337(T)
PAYNE (PETER R) INC ROCKVILLE MD
(USAAVLABS-TR-66-18)
F AD-632 126 FLD. 13/11

•DA-44-177-AMC-892(T)
MISSISSIPPI STATE UNIV STATE COLLEGE DEPT OF AEROPHYSICS
(USAAVLABS-TR-65-79)
AD-632 520 FLD. 20/4

•DA-44-188-ARO-2
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV
ALEXANDRIA VA
AD-632 490 FLD. 5/9
AD-632 494 FLD. 5/9

•DA-44-007-MD-981
MARYLAND UNIV COLLEGE PARK
AD-632 380 FLD. 6/3

•DA-44-176-XZ-343
STANFORD RESEARCH INST MENLO PARK CALIF
(DASA-1757)
F AD-632 106 FLD. 8/13

•DA-91-591-EUC-3583
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICAL CHEMISTRY
AD-632 063 FLD. 7/5
AD-632 064 FLD. 7/4

•DA-91-591-EUC-3593
SPINEDI (PAOLO) ROME (ITALY)
AD-632 370 FLD. 7/4

•DA-91-591-EUC-3789
ROGOFF MEDICAL RESEARCH INST PETAH TIQWA (ISRAEL)•
AD-632 372 FLD. 6/20

•DA-AMC-28-043-G20
COLORADO STATE UNIV FORT COLLINS FLUID MECHANICS PROGRAM
CER65SCC66
AD-632 110 FLD. 20/4

•DA-ARO-44-092-65-G64
CHILE UNIV SANTIAGO DEPARTAMENTO DE VIROLOGIA
AD-632 336 FLD. 6/13

•DA-ARO(D)-31-124-G66
PENNSYLVANIA UNIV PHILADELPHIA
(AROD-3006:7)
AD-632 371 FLD. 20/12

•DA-ARO(D)-31-124-G257
CALIFORNIA UNIV BERKELEY DEPT OF CIVIL ENGINEERING
(AROD-4997:8)
AD-632 381 FLD. 20/11

•DA-ARO(D)-31-124-G261
NEBRASKA UNIV LINCOLN DEPT OF MECHANICAL ENGINEERING
PAPER NO. 66-FE-5
(AROD-3202:3)
AD-632 382 FLD. 20/4

•DA-ARO(D)-31-124-G287
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING
(AROD-3397:9)
AD-632 383 FLD. 20/12

•DA-ARO(D)-31-124-G288
ARIZONA UNIV TUCSON DEPT OF METALLURGICAL ENGINEERING
(AROD-3400:5)
F AD-632 554 FLD. 20/2

•DA-ARO(D)-31-124-G337
STANFORD UNIV CALIF DEPT OF PHYSICS
(AROD-3269:15)
AD-632 367 FLD. 20/8
(AROD-3269:19)
AD-632 368 FLD. 20/8

•DA-ARO(D)-31-124-G348
MICHIGAN UNIV ANN ARBOR
(AROD-3559:4)
AD-632 384 FLD. 19/4

•DA-ARO-D-31-124-G372
FLORIDA UNIV GAINESVILLE DEPT OF ENGINEERING SCIENCE AND MECHANICS
(AROD-3268:3)
AD-631 988 FLD. 20/11

•DA-ARO(D)-31-124-G394
CATHOLIC UNIV OF AMERICA WASHINGTON D C
(AROD-3176:2)
AD-632 389 FLD. 20/11

•DA-ARO(D)-31-124-G422
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
(AROD-3888:1)
AD-632 444 FLD. 20/10

•DA-ARO(D)-31-124-G424
NEW YORK UNIV N Y
(AROD-4054:14)
F AD-632 552 FLD. 20/12

•DA-ARO(D)-31-124-G469
SAN DIEGO STATE COLL CALIF DEPT OF CHEMISTRY
(AROD-4192:4)
AD-632 429 FLD. 20/13

•DA-ARO(D)-31-124-G484
BROWN UNIV PROVIDENCE R I
(AROD-1271:47)
AD-632 428 FLD. 20/4

•DA-ARO(D)-31-124-G492
IOWA STATE UNIV OF SCIENCE AND TECHNOLOGY AMES DEPT OF CHEMISTRY
(AROD-4319:1)
AD-632 443 FLD. 7/3

•DA-ARO(D)-31-124-G499
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
(AROD-2832:27)
AD-632 427 FLD. 7/3

•DA-ARO(D)-31-124-G497
WISCONSIN UNIV MADISON DEPT OF CHEMISTRY
(AROD-3921:4)
AD-632 298 FLD. 7/3

•DA-ARO(D)-31-124-G900
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
(AROD-4486:4)
AD-632 918 FLD. 7/2

•DA-ARO(D)-31-124-G909
CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF THE AEROSPACE AND MECHANICAL ENGINEERING SCIENCES
(AROD-4479:9)
AD-632 369 FLD. 20/4

•DA-ARO(D)-31-124-G969
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
(AROD-4969:19)
AD-632 919 FLD. 20/6

•DA-ARO(D)-31-124-G980
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
(AROD-3222:3)
AD-632 992 FLD. 20/11

•DA-ARO(D)-31-124-G609
DUKE UNIV DURHAM N C DEPT OF PHYSICS
(AROD-3233:29)
AD-632 373 FLD. 20/10
(AROD-3233:31)
AD-632 374 FLD. 20/10
(AROD-3233:30)
AD-632 375 FLD. 20/10

•DA-ARO(D)-31-124-G620
NORTH CAROLINA STATE UNIV RALEIGH
(AROD-4109:10)
AD-632 399 FLD. 20/11

•DA-ARO(D)-31-124-G732
DUKE UNIV DURHAM N C DEPT OF PHYSICS
AD-632 334 FLD. 20/12

•DA-ARO(D)-31-124-G767
MICHIGAN UNIV ANN ARBOR
37701-1-T
(AROD-4447:1)
AD-632 426 FLD. 12/2

•DA-ARO(D)-31-124-G791
OREGON STATE UNIV CORVALLIS
(AROD-3812:2)
AD-632 337 FLD. 7/4
(AROD-3812:3)
AD-632 338 FLD. 7/4

•DA-MD-49-193-63-G99
LOS ANGELES COUNTY MUSEUM CALIF
AD-632 342 FLD. 6/3

•N00019-66-C0061
TEXAS UNIV AUSTIN DEPT OF ASTRONOMY
TR-1
AD-632 021 FLD. 3/2

•N123(62738)27972A
TRW SPACE TECHNOLOGY LABS LOS ANGELES CALIF
AD-631 857 FLD. 9/6

•N196-91307
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF
(NAEC-ASL-1096)
F AD-632 123 FLD. 1/3

•N228-(62479)69419
STANFORD RESEARCH INST MENLO PARK CALIF
AD-632 366 FLD. 13/12

•N228(62479)69718
URS CORP BURLINGAME CALIF
URS-696-9
(USNRDL-TRC-9)
F AD-632 211 FLD. 15/3

•N228(62479)68466
HUGHES AIRCRAFT CO FULLERTON CALIF
FR-69-10-243
(USNRDL-TRC-19)
F AD-632 112 FLD. 18/8

•N600(19)62908
DAVIDSON LAB STEVENS INST OF TECH HOBOKEN N J
R-1102
AD-632 398 FLD. 1/3

•N600(19)63823
SPERRY RAND RESEARCH CENTER SUDBURY MASS
SRRC-CR-66-13
AD-632 991 FLD. 9/1

•N62258-3882
HEBREW UNIV JERUSALEM (ISRAEL)
TR-19
AD-631 862 FLD. 5/7

•N62706-1679
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
7921-208
AD-632 294 FLD. 8/3

•N62958-2953
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
(AFOSR-2988)
AD-632 048 FLD. 6/3

•N62958-3882
HEBREW UNIV JERUSALEM (ISRAEL)
TR-17
AD-631 860 FLD. 9/2
TR-20
AD-631 863 FLD. 12/1
HEBREW UNIV JERUSALEM (ISRAEL) APPLIED LOGIC BRANCH
TR-18
AD-631 861 FLD. 5/7

•NASA ORDER-R-39
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
NAMI-959
(NAVMED-MR009.13-9010.1-9)
AD-631 999 FLD. 6/3

•NASA ORDER-R-93
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
AD-632 601 FLD. 6/19

•NBY-32275
VIRGINIA POLYTECHNIC INST BLACKSBURG
F AD-632 080 FLD. 8/13

•NBY-63878
UNDERWATER STORAGE INC WASHINGTON D C•
AD-631 927 FLD. 13/10

•NOBS-88629
AMERICAN POWER JET CO RIDGEFIELD N J
APJ-376-1
AD-632 011 FLD. 13/8

•NOBS-92193
OLIN MATHIESON CHEMICAL CORP NEW HAVEN CONN CHEMICALS DIV
F AD-632 039 FLD. 11/10

•NOBS-92190
UNITED STATES RUBBER CO NISHAWAKA IND
AD-632 092 FLD. 13/9

•NOBS-94232
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
AD-632 009 FLD. 13/8

•NOBSR-89328
GENERAL ELECTRIC CO SYRACUSE N Y ELECTRONICS LAB
AD-632 008 FLD. 9/1

•NOBSR-93089
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
4071169
AD-632 008 FLD. 8/10
4110366
AD-632 009 FLD. 17/1
4090266
AD-632 010 FLD. 8/3

•NONR-220(19)
OWENS VALLEY RADIO OBSERVATORY CALIF INST OF TECH PASADENA
AD-632 345 FLD. 3/2
AD-632 346 FLD. 3/2
3
AD-632 424 FLD. 3/2
AD-632 512 FLD. 3/2
AD-632 513 FLD. 3/2

•NONR-220(90)
CALIFORNIA INST OF TECH PASADENA
TR-30
AD-632 470 FLD. 20/9

•NONR-222(77)
CALIFORNIA UNIV BERKELEY CENTER FOR RESEARCH IN MANAGEMENT SCIENCE
TR-22
AD-631 979 FLD. 12/2

•NONR-222(83)
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ORC-66-6
AD-631 839 FLD. 9/2
ORC-66-11
AD-632 495 FLD. 5/3

•NONR-225(93)
STANFORD UNIV CALIF DEPT OF STATISTICS
TR-87
AD-632 535 FLD. 12/1

•NONR-229(67)
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-428
AD-632 051 FLD. 20/8
HEPL-437
AD-632 510 FLD. 20/7
HEPL-435
AD-632 511 FLD. 20/8
HEPL-424
AD-632 543 FLD. 20/8

•NONR-233(92)
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
66-20
AD-632 230 FLD. 9/3

•NONR-233(94)
CALIFORNIA UNIV LOS ANGELES DEPT OF PSYCHOLOGY
TR-18
AD-632 491 FLD. 5/10

•NONR-233(73)
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
WMSI WORKING PAPER-96
AD-632 526 FLD. 12/1

•NONR-233(75)
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
WMSI WORKING PAPER-93
AD-632 524 FLD. 5/10
WMSI WORKING PAPER-98
AD-632 525 FLD. 12/2

•NONR-401(47)
MATERIALS SCIENCE CENTER CORNELL UNIV ITHACA N Y
MSC-474
AD-631 931 FLD. 7/3

•NONR-404(18)
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J STATISTICS CENTER
TR-N-23
AD-632 236 FLD. 13/8

•NONR-477(15)
WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS
TR-28
AD-632 516 FLD. 12/1

•NONR-562(35)
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING
12
AD-631 945 FLD. 20/1
13
AD-631 946 FLD. 20/4

•NONR-591(09)
RENSSELAER POLYTECHNIC INST TROY N Y
RPI-MATH-REP-71
AD-632 471 FLD. 20/1

•NONR-760(29)
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
MSRR-68
AD-631 937 FLD. 5/3
MSRR-69
AD-631 949 FLD. 5/3
MSRR-70
AD-631 947 FLD. 5/3

•NONR-839(32) (FBM)
POLYTECHNIC INST OF BROOKLYN N Y
PIBAL-912
AD-632 002 FLD. 20/11

•NONR-839(38)
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
PIBMRI-1295.2-66
S AD-631 859 FLD. 20/9

•NONR-839(40)FBM
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-908
AD-631 939 FLD. 20/11

•NONR-969(04)
INDIANA UNIV MEDICAL CENTER INDIANAPOLIS DEPT OF NEUROLOGY
AD-631 925 FLD. 6/20

•NONR-1181(12)
DUKE UNIV DURHAM N C DEPT OF PHYSICS
AD-632 334 FLD. 20/12

•NONR-1202(17)
WISCONSIN UNIV MADISON DEPT OF STATISTICS
TR-61
AD-632 518 FLD. 13/8
TR-63
AD-632 519 FLD. 12/1

•NONR-1228(10)
NORTHWESTERN UNIV EVANSTON ILL TECHNOLOGICAL INST
SYSTEMS RESEARCH MEMO-149
AD-631 929 FLD. 12/2
SRM-139
AD-632 107 FLD. 12/2

•NONR-1228(20)
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS SCIENCE
TR-10
AD-632 496 FLD. 11/6

•NONR-1228(21)
NORTHWESTERN UNIV EVANSTON ILL
TR-1-66
AD-631 930 FLD. 18/9

•NONR-1228(35)
NORTHWESTERN UNIV EVANSTON ILL DEPT OF GEOGRAPHY
TR-2
AD-631 868 FLD. 8/6

•NONR-1834(05)
ILLINOIS UNIV URBANA DEPT OF PHYSICS
AD-632 578 FLD. 20/8
AD-632 579 FLD. 20/8
ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB
C00-1198-365
AD-632 577 FLD. 14/2

•NONR-1841(34)
MASSACHUSETTS INST OF TECH CAMBRIDGE
AD-632 611 FLD. 20/12

•NONR-1841(51)
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
TR-3
AD-631 958 FLD. 20/12

•NONR-1841(73)
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS LAB
DSR-8734-7
AD-632 124 FLD. 20/13
F AD-632 594 FLD. 20/4

•NONR-1841(74)
MASSACHUSETTS INST OF TECH CAMBRIDGE
AD-632 018 FLD. 8/7

•NONR-1858(98)
FRICK CHEMICAL LAB PRINCETON UNIV N J
TR-2
AD-631 999 FLD. 7/4
TR-4
AD-632 000 FLD. 7/4
TR-5
AD-632 001 FLD. 7/3
TR-3
AD-632 003 FLD. 7/4

•NONR-1866(14)
MALLINCKRODT CHEMICAL LAB HARVARD UNIV CAMBRIDGE MASS
AD-631 858 FLD. 7/4

•NONR-1866(98)
HARVARD COLL OBSERVATORY CAMBRIDGE MASS
SCIENTIFIC-10
AD-632 105 FLD. 3/2

•NONR-2216(12)
SCRIPPS INSTITUTION OF OCEANOGRAPHY LA JOLLA CALIF
SIO REF-65-8
AD-632 930 FLD. 8/10

•NONR-3029(00)
GARRETT CORP PHOENIX ARIZ AIRESEARCH MFG DIV
AP-3017-R
AD-632 302 FLD. 1/3

•NONR-3173(00)
GARRETT CORP PHOENIX ARIZ AIRESEARCH MFG DIV
AP-3025-R
AD-632 391 FLD. 1/3

•NONR-3634(02)
KANSAS STATE UNIV MANHATTAN
F AD-632 019 FLD. 20/6

•NONR-3798(01)
HAWAII INST OF GEOPHYSICS HONOLULU
HIG-65-16
AD-631 847 FLD. 8/11
HIG-66-4
AD-632 156 FLD. 8/11

•NONR-3798(03)
HAWAII INST OF GEOPHYSICS HONOLULU
HIG-65-16
AD-631 847 FLD. 8/11

•NONR-3963(09)
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METALLURGY
TR-1
AD-631 928 FLD. 11/6

•NONR-4120(00)
HUMAN FACTORS RESEARCH INC SANTA BARBARA CALIF
TR-790-6
AD-632 983 FLD. 5/10

•NONR-4129(00)
LENINGRAD POLYTECHNICAL INST KALININ (USSR)
F AD-632 007 FLD. 20/5

•NONR-4134(00)
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y
TR-66-092.13
F AD-632 178 FLD. 20/5

•NONR-4200(00)
AMERICAN CYANAMID CO STAMFORD CONN CENTRAL RESEARCH DIV
06-1492-26-911
AD-632 220 FLD. 7/5

•NONR-4336(00)
DELAWARE UNIV NEWARK DEPT OF PHYSICS
TR-8
AD-631 867 FLD. 20/12

•NONR-4343(00)
INDIANA UNIV MEDICAL CENTER INDIANAPOLIS DEPT OF NEUROLOGY
AD-631 925 FLD. 6/20

•NONR-4596(00)
RCA VICTOR CO LTD MONTREAL (QUEBEC) RESEARCH LABS
RR-7-801-39
F AD-632 352 FLD. 20/9

•NONR-4656(00)
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
AD-632 545 FLD. 20/5

•NONR-4673(00)
STATE UNIV OF NEW YORK STONY BROOK DEPT OF MATERIALS SCIENCE
TR-2
AD-631 997 FLD. 7/5

•NONR-4848(00)
PHILCO BLUE BELL PA APPLIED RESEARCH LAB
A055-F
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632 435	20/9
632 436	13/11
632 437	20/10
632 438	7/9
632 439	21/8
632 440	20/9
632 441	9/1
632 442	20/11
632 443	7/3
632 444	20/10
632 445	7/9
632 446	20/11
632 447	20/9
632 448	7/2
632 449	20/10
632 450	17/7
632 451	7/2
632 452	20/11
632 453	8/11
632 454	20/11
632 455	14/2
632 456	11/6
632 457	6/12
632 458	20/12
632 459	1/3
632 460	13/10
632 461	21/9.1
632 462	5/9
632 463	7/5
632 464	7/3
632 465	20/9
632 466	20/12
632 467	20/12
632 468	9/1
632 469	1/2
632 470	20/9
632 471	20/1
632 472	14/5
632 473	5/2
632 474	3/3
632 475	9/2
632 476	5/6
632 477	9/2
632 478	12/2
632 479	12/1
632 480	5/2
632 481	5/1
632 482	6/19
632 483	6/19
632 484	7/5
632 485	8/5
632 486	8/10
632 487	22/2
632 488	20/9
632 489	17/9
632 490	5/9
632 491	5/10
632 492	11/9
632 493	13/9
632 494	5/9
632 495	5/3
632 496	8/5
632 497	5/9
632 498	9/3
632 499	5/3
632 500	6/16
632 501	6/16
632 502	6/5
632 503	6/16
632 504	13/9
632 505	5/10
632 506	6/16
632 507	6/16
632 508	6/1
632 509	6/5
632 510	20/7
632 511	20/8
632 512	3/2
632 513	3/2
632 514	11/12
632 515	9/2
632 516	12/1
632 517	14/2
632 518	13/8
632 519	12/1
632 520	20/9
632 521	19/3
632 522	6/16
632 523	7/9
632 524	5/10
632 525	12/2
632 526	12/1
632 527	18/9
632 528	7/5
632 529	20/1
632 530	8/10
632 531	10/2
632 532	17/2
632 533	16/2
632 534	18/11
632 535	12/1
632 536	16/2
632 537	9/5
632 538	11/9
632 539	20/12
632 540	6/18
632 541	20/9
632 542	20/9
632 543	20/8
632 544	6/9
632 545	20/5
632 546	9/1
632 547	9/1
632 548	8/5
632 549	6/19
632 550	6/16
632 551	5/2
632 552	20/12
632 553	12/2
632 554	20/2
632 555	6/19
632 556	9/1
632 557	20/3
632 558	9/2
632 559	7/9
632 560	15/5

632 561	4/2
632 562	4/1
632 563	9/2
632 564	20/2
632 565	4/1
632 566	20/5
632 567	6/19
632 568	9/9
632 569	9/7
632 570	1/3
632 571	9/10
632 572	1/3
632 573	13/4
632 574	9/4
632 575	21/2
632 576	9/2
632 577	14/2
632 578	20/8
632 579	20/8
632 580	6/8
632 581	9/2
632 582	6/20
632 583	9/10
632 584	6/5
632 585	13/9
632 586	8/6
632 587	5/2
632 588	7/3
632 589	7/3
632 590	12/1
632 591	7/3
632 592	6/16
632 593	7/3
632 594	20/4
632 595	6/21
632 596	14/2
632 597	9/2
632 598	14/2
632 599	6/4
632 600	5/2
632 601	6/19
632 602	9/2
632 603	20/6
632 604	13/10
632 605	13/13
632 606	21/2
632 607	20/1
632 608	11/6
632 609	5/9
632 610	9/2
632 611	20/12
632 612	6/16
632 613	6/16
632 614	6/16
632 615	6/16
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632 619	6/16
632 620	6/16
632 621	6/16
632 622	6/16
632 623	6/16
632 624	6/16
632 625	6/16
632 626	6/5
632 627	6/19
632 628	6/1
632 629	5/10
632 630	5/10
632 631	5/10
632 632	5/10
632 633	6/16
632 634	6/1
632 635	6/16
632 636	6/16
632 637	6/16
632 638	6/16
632 639	6/16
632 640	6/16
632 641	6/16
632 642	6/16
632 643	6/16
632 644	6/16
632 645	6/16
632 646	6/16
632 647	6/16
632 648	6/16
632 649	6/16
632 650	6/16
632 651	7/9
632 652	6/1
632 653	6/16
632 654	6/16
632 655	6/16

CIVILIAN AGENCY RESEARCH REPORTS AND RELATED MATERIAL

1. AERONAUTICS

N66-10068 **Field 1C**
CFSTI Prices: HC$2.00 MF$ 50
Office National d Etudes et de Recherches Aerospatiales, Chatillon-Sous-Bagneux (France).
REALIZATION AND ANALYSIS OF IMPACT TESTS ON AIRCRAFT STRUCTURES AND ENGINES ON THE GROUND AND IN FLIGHT,
by G. Piazzoli. 1965, 32p ONERA-TP-230

Descriptors: *Aircraft structure, *Aircraft engine, *Flight test, *Ground test, *Impact test.

N66-10513 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.75
Aeronautical Research Labs., Melbourne (Australia).
A METHOD FOR THE ESTIMATION OF GUST LOADS IN A FLEXIBLE AIRCRAFT,
by M. G. Chandivert and R. W. Traill-Nash. Jan 1965, 91p ARL/SM-299

Descriptors: *Flexible body, *Vertical motion, *Aircraft, *Motion equation.

N66-11481 **Field 1B**
CFSTI Prices: HC$5.00 MF$1.00
National Research Council of Canada, Ottawa (Ontario).
QUARTERLY BULLETIN OF THE DIVISION OF MECHANICAL ENGINEERING AND THE NATIONAL AERONAUTICAL ESTABLISHMENT, 1 APRIL-30 JUNE 1965.
1965, 1p DME/NAE-1965/2/

Descriptors: *Computer simulation, *Data reduction, *Pattern recognition, *Quantitative analysis, *V/Stol aircraft.

N66-11575 **Field 1B**
CFSTI Prices: HC$2.00 MF$0.50
Aeronautical Research Council, London (England).
A PARAMETRIC STUDY OF TAKE-OFF AND LANDING DISTANCES FOR HIGH-LIFT AIRCRAFT,
by B. J. Edwards and W. A. Mair. Oct 65, 33p ARC-CP-823
Prepared in cooperation with Cambridge Univ. (England).

Descriptors: *Aircraft landing, *Takeoff ; landing.

N66-11633 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Advisory Group for Aerospace Research and Development, Paris (France).
EJECTORS AND MIXING OF STREAMS. BIBLIOGRAPHY NO. 6,
by M. Dyke and J. Seddon. Nov 64, 47p

Descriptors: *Bibliography, *Ejector, *Stream, *Subsonic flow, *Supersonic flow.

N66-11690 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.75
Aeronautical research Council, London (England).
MEASUREMENT OF AIR TEMPERATURE ON AN AIRCRAFT TRAVELLING AT HIGH SUBSONIC AND SUPERSONIC SPEEDS,
by P. J. Haynes and A. A. Woodfield. 1965, 79p ARC-CP-809, ARC-25416

Descriptors: *Aircraft instrumentation, *Subsonic speed, *Supersonic speed, *Temperature measurement.

N66-11693 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Liverpool Univ. (England).
POTENTIAL FLOW THROUGH CASCADES - A COMPARISON BETWEEN EXACT AND APPROXIMATE SOLUTIONS,
by J. P. Gostelow. 1965, 30p ARC-CP-807

Descriptors: *Cascade flow, *Flow theory, *Potential flow.

N66-11725 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Aeronautical Research Council, London (England).
THE MIXING BETWEEN HOT AND COLD AIR-STREAMS IN A CENTRIFUGAL FIELD,
by Z. M. Jawor, M. Smith, and B. S. Stratford. Apr 64, 33p ARC-CP-793, ARC-26123

Descriptors: *Turbine engine, *Aircraft engine, *Gas turbine, *Mixing length flow theory, *Weight.

N66-11731 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Liverpool Univ. (England). Dept. of Mechanical Engineering.
POTENTIAL FLOW THROUGH CASCADES EXTENSIONS TO AN EXACT THEORY,
by J. P. Gostelow. 1965, 36p ARC-CP-808

Descriptors: *Cascade flow, *Conformal trans formation, *Potential flow, *Pressure distribution.

N66-14777 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
COMPUTER PROGRAM FOR CALCULATING FLOW DISTRIBUTION IN A RADIAL-INFLOW TURBINE,
by T. Katsanis. 1965, 50p
NASA TM-X-52161

Descriptors: *Flow distribution, *Radial flow, *Computer program, *Fortran, *Gas turbine.

N66-15231 **Field 1C**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
GROUND EFFECTS ON SINGLE-JET AND MULTIPLE -JET VTOL MODELS AT TRANSITION SPEEDS OVER STATIONARY AND MOVING GROUND PLANES,
by R. D. Vogler. Jan 66, 68p NASA-TN-D-3213

Descriptors: *Vertical takeoff and landing, *Ground-effect, *Wing-fuselage combination.

N66-15232 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.75
Meteorology Research, Inc., Altadena, Calif.
OPERATIONAL APPLICATION OF A UNIVERSAL TURBULENCE MEASURING SYSTEM.
Final rept.,
by S. Berman, P. B. MacCready, Jr., A. Webster, andR. E. Williamson. Nov 65, 96p MR165-FR-301
Contract NAS4-784
NASA CR-62025

Descriptors: *Turbulence measuring apparatus, *Aeronautics, *Gust load.

N66-15363 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF FREE-MOLECULE FLOW WITH SURFACE DIFFUSION THROUGH CYLINDRICAL TUBES,
by T. W. Reynolds and E. A. Richley. Jan 66, 44p NASA-TN-D-3225

Descriptors: *Circular cylinder, *Circular tube, *Free molecular flow, *Gas flow, *Surface diffusion effect.

PB-169 369 **Field 1A**
CFSTI Prices: HC$8.60 MF$0.75
Wright Air Development Center, Wright-Patterson AFB, Ohio.
AN APPROXIMATE METHOD FOR THE CALCULATION OF NONSTATIONARY AIR FORCES AT SUBSONIC SPEEDS.
Technical rept.,
by Henry E. Fettis. Mar 52, 86p WADC-TR-52-56

Descriptors: (*Airfoils, Pressure), (*Subsonic characteristics, Force (Mechanics)), Approximation (Mathematics), Numerical analysis, Aerodynamic loading, Moments, Integral equations, Lift.

The report explains and illustrates a method of computing the non-stationary forces and moments on an oscillating airfoil at subsonic speeds. The process is based on the well known Possio integral equation relating the pressure on the airfoil to the normal velocity. Part I contains the theoretical development which leads to the required equations for determining the lift and moment. In Part II the method of Part I is applied to the computation of the aerodynamic lift and moment coefficients for four principal degrees of freedom of the airfoil, these being: (1) Translation of the complete chord of the airfoil in a direction normal to the forward velocity (positive down). (2) Rotation of the entire chord about the forward quarter-chord point (positive for increasing angle of attack). (3) Translation of the portion of the airfoil extending from an arbitrary point to the trailing edge, in a direction normal to the forward velocity. (4) Rotation about an arbitrary point of that portion of the airfoil extending from that point to the trailing edge. The appendices contain the detailed mathematical derivation of the various formulae involved in the problem. (Author)

PB-169 687 **Field 1B, 5B**
CFSTI Price: HC$9.00
National Advisory Committee for Aeronautics, Washington, D. C.
INDEX OF NACA TECHNICAL PUBLICATIONS, 1915-1949.
1949, 610p

Descriptors: (*Indexes, Aeronautics), (*Aeronautics, Documentation), Classification, Bibliographies, Aero dynamics, Aerodynamic configurations, Aerodynamic characteristics, Meteorology, Materials, Structures, Combustion, Fuels, Lubrication, Heat transfer, Hydrodynamics, Aircraft.

The Index of NACA Technical Publications covers reports issued from the date of origin of the Committee in 1915 until approximately September 1949. Because omissions were noted after publication of the Index issued in 1947, and since many new reports have been released since that time, it was decided to issue a new volume to supersede completely the 1947 Index, with supplements to be issued regularly in the future. Commencing with all publications issued after September 1, 1949, subject classifications were revised, the most important change involving the transfer of aircraft loads reports from the Aerodynamics classification to Structures. For those maintaining a file of NACA index cards, it is recommended that cards

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issued for reports dated prior to September 1, 1949 be removed from the file. This volume includes the same index information. Supplements covering periods following September 1, 1949, will be arranged according to the revised subject classifications. In this volume, the subject classifications are indexed in order of breakdown. There is included in the back of this volume an alphabetical arrangement of the subject classifications. (Author)

PB-169 917 **Field 1B, 13L, 1C**
CFSTI Price: HC$2.60
Lightning and Transients Research Inst., Minneapolis, Minn.
AIRCRAFT PROTECTION FROM ATMOSPHERIC ELECTRICAL HAZARDS.
Quarterly rept. no. 11, Oct-Dec 59.
Jan 60, 27p L-T-363
Contract AF 33 (616)-3991,
Proj. AF-7 (77-4357),
Task 43387
WADD TN-60-35,
AD 235 135
Prepared in cooperation with Bureau of Aeronautics (Navy), Washington, D. C.

Descriptors: (*Lightning, Aircraft), (*Aviation safety, Lightning), (*Fuel systems, Aviation safety), Aircraft fires, Aircraft engine ducts, Aviation fuels, Atmospheric electricity, Engine fuel system components, Voltage, Aviation accidents, Lightning arresters, Explosions, Vapors, Airships.

Recent studies have revealed the possibility that aircraft explosions could be caused by the ignition of the fuel vent vapors due to streamers resulting on the rim of the vent tube with a lightning stroke to any part of an aircraft: When an aircraft becomes part of the lightning channel, the aircraft potential rises to the order of 10 to the 8th power volts and the electrical gradient about the aircraft is large enough to initiate streamers off many points on the aricraft, including fuel vent tubes in relatively shielded locations. Preliminary measurements under a related NASA sponsored program have shown that such streamers have enough energy to ignite certain fuel vapor mixtures, and these do not leave tangible evidence of having occurred such as pit marks. Thus consideration should be given to a review of potential hazards at various specific fuel vent installations and to the development of protective measures such as vent shielding. Interim lightning protection measures for nonrigid airships were also considered. (Author)

2. AGRICULTURE

N66-17047 **Field 2D**
CFSTI Prices: HC$4.00 MF$1.00
IBM. Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART I AGRICULTURE/FORESTRY.
21 Feb 66, 148p
Contract NASw-1215
NASA CR-70350

Descriptors: *Agriculture, *Experiment design, *Food, *Manned orbital research laboratory (Morl).

PB-169 752 **Field 2B, 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.25
New York State Coll. of Agriculture, Cornell Univ., Ithaca.
1963 SUGAR BEET FEASIBILITY STUDY,
by N. C. Brady. 20 Feb 64, 200p TWS-63-1 (Rev.)

Descriptors: (*Agriculture, New York), (*Economics, New York), (*Soils, New York), Feasibility studies, Employment, Atmospheric precipitation, Geography.

Identifiers: Sugar beet, Area redevelopment.

The 1963 study had the broad objectives of determining the feasibility of growing sugar beets on selected soils in Central New York and to determine the extent of resources available in this proposed sugar beet growing area. More specific objectives related to the current study were as follows: To determine the commercial yield level and quality of beets and sugar that might be expected on soils which were identified with respect to type and productivity and which are representative of the Central New York area. To determine the extent and importance of cultural, pest and management problems in the commercial growing of sugar beets in the area. To determine soil types on different kinds of farms in Central New York for use in ascertaining the probable acreage on which sugar beets can and likely will be grown. To determine the commerical processibility of sugar beets grown in Central New York by appropriate chemical analysis. To determine from a random sample of farms in this area, the farm resources which might be used for growing beets and the interest and ability of the respective farm operators in producing such a crop.

3. ASTRONOMY AND ASTROPHYSICS

N66-11611 **Field 3A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
A PHYSICO-CHEMICAL MODEL OF THE COMETARY NUCLEUS,
by A. H. Delsemme. Nov 65, 42p NASA-TT-F-9735
Published in Vers un Modele Physico - Chimique du Noyau Cometaire, 1965.

Descriptors: *Balance equation, *Comet, *Physical chemistry, *Energy equation, *Nucleus, *Quantitative analysis.

N66-14082 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Astronomical Observatory (Japan).
DISCUSSIONS OF OCCULTATIONS OBSERVED IN JAPAN WITH THE PHOTOELECTRIC EQUIPMENTS FROM 1960 TO 1962,
by S. Aoki, Y. Endo, and M. Takahashi. 1965, 6p
Tokyo Astron. Bull. n167 (S2) p2053-9 Jan 5, 1965.

Descriptors: *Astronomical observatory, *Japan, *Photoelectric apparatus, *Stellar occultation.

N66-14280 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
SOME ASPECTS OF THE CIRCULATION OF MARS,
by C. Leovy. Nov 65, 27p
Contract NASR-21 (07)
NASA CR-68992
Prepared for presentation at Conf. on Exploration of the Planets, Blacksburg, Va. 16-20 Aug 1965.

Descriptors: *Earth atmosphere, *Heat balance, *Mars atmosphere, *Temperature distribution.

N66-14281 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
GCA Technology Div., GCA Corp., Bedford, Mass.
PHYSICS OF PLANETARY ATMOSPHERES. III. THE TIME-DEPENDENT COUPLED HARTREE-FOCK APPROXIMATION,
by A. Dalgarno and G. A. Victor. Aug 65, 12p
GCA-TR-65-24-N
Contract NASw-1283
NASA CR-68991

Descriptors: *Hartree-Fock calculation, *Refractive index, *Helium.

N66-15247 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
California Inst. of Tech., Pasadena.
THE GENERAL RELATIVISTIC INSTABILITY OF MASSIVE STARS,
by W. A. Fowler. 6 Nov 64, 22p
Contract Nonr-220 (47), Grant NGR-05-002-028
NASA CR-60768
Presented in part at the Joint Discussion on Radio Galaxies, Gen. Assembly of the Intern. Astrophys. Union (12th), Hamburg, Aug 27, 1964 and in part at the Solvay Congr. (13th), Brussels, Sep 24, 1964.

Descriptors: *Polytropic process, *Relativistic effect, *Binding energy.

N66-15318 **Field 3B**
CFSTI Prices: HC$5.00 MF$1.00
Geophysics Corp. of America, Bedford, Mass.
A CONGERIES OF ABSORPTION CROSS SECTIONS FOR WAVELENGTHS LESS THAN 3000 ANGSTROM,
by A. C. Holland and J. O. Sullivan. Jan 66, 179p
GAC-TR-64-20-N
Contracts NASw-840, AF 33/615/-1675
NASA CR-371,
NASA CR-15

Descriptors: *Atmospheric absorption, *Wavelength, *Radiation absorption, *Ultraviolet spectrum.

N66-17057 **Field 3B**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART XI. ASTRONOMY/ASTROPHYSICS.
21 Feb 66, 125p
Contract NASw-1215
NASA CR-70345

Descriptors: *Astronomy, *Experiment design, *Astrophysics, *Manned orbital research laboratory (Morl).

N66-17059 **Field 3B**
CFSTI Prices: HC$4.00 MF$1.25
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART XIII. PHYSICAL SCIENCES.
21 Feb 66, 183p
Contract NASw-1215
NASA CR-70355

Descriptors: *Manned orbital research laboratory (Morl), *Physical science, *Space environment, *Experiment design.

N66-17085 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison.
STELLAR SPECTROPHOTOMETRY IN THE FAR ULTRAVIOLET.
Final rept.,
by A. D. Code. 1964, 15p
Contract NASw-66
NASA CR-70302

Descriptors: *Rocket aircraft, *Satellite design, *Stellar spectrophotometry, *Ultraviolet spectro photometry, *Vacuum ultraviolet.

4. ATMOSPHERIC SCIENCES

N66-13703 **Field 4B, 14E**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury, (Australia). Dept. of Supply.
AN EXPERIMENT USING METEOROLOGICAL BALLOONS TO DETERMINE THE LIMITING

PHOTOGRAPHIC RANGES OF DISTANT SPHERES,
by D. J. Gambling. Sep 65, 34p ISD-63

Descriptors: *Meteorological balloon, *Photography, *Sphere.

N66-13728 **Field 4A**
CFSTI Prices: HC$7.00 MF$2.00
Defence Research Telecommunications Establishment, Ottawa (Ontario).
ALOUETTE I IONOSPHERIC DATA N/H/, VOLUME 3, NUMBER 1.
1 Oct 65, 363p

Descriptors: *Alouette I Satellite, *Sounding, *Electron density profile.

N66-14952 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
Pittsburgh Univ., Pa. Dept. of Physics.
THE PROBLEM OF ATOMIC HYDROGEN,
by T. M. Donahue. 11 Oct 65, 51p SRCC-15
Contract NASr-179
NASA CR-69211
Presented at the Symp. on Aeronomy, Cambridge, Mass., Aug 1965.

Descriptors: *Emission spectrum, *Hydrogen atom, *Lyman alpha radiation, *Solar radiation, *Optical absorption.

N66-15317 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
INVESTIGATION OF WARM FOG PROPERTIES AND FOG MODIFICATION CONCEPTS,
by R. J. Pilie. Jan 66, 76p
Contract NASR-156
NASA CR-368

Descriptors: *Coalescence, *Monomolecular layer, *Fog, *Mathematical model, *Surfactant.

N66-17051 **Field 4A**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART V. ATMOSPHERIC SCIENCE AND TECHNOLOGY.
21 Feb 66, 158p
Contract NASw-1215
NASA CR-70342-Vol-B-Pt-5

Descriptors: *Experiment design, *Atmospherics, *Manned orbital research laboratory (Morl).

5. BEHAVIORAL AND SOCIAL SCIENCES

N66-11688 **Field 5F**
CFSTI Prices: HC$2.00 MF$0.50
Washington Univ., St. Louis, Mo. Dept. of Economics.
DEFENSE, SPACE EXPENDITURES AND THE DOMESTIC ECONOMY,
by M. L. Weidenbaum. Sep 65, 39p Working paper-6515
Grant NsG-342
NASA CR-67976

Descriptors: *Defense, *Economics, *Space program.

N66-14290 **Field 5H**
CFSTI Prices: HC$1.00 MF$0.50
Univ. of Michigan, Ann Arbor. Office of Research Administration.
DEVELOPMENT OF ON-LINE MAN-MACHINE SYSTEM PERFORMANCE MEASUREMENT AND DISPLAY TECHNIQUES LETTER PROGRESS REPORT, JUN 1-AUG 31, 1965,
by R. M. Howe and R. W. Pew. 5 Nov 65, 5p
Rept. no. 06343-6-P
Contract NASR-54 (06)
NASA CR-68981

Descriptors: *Display system, *Human performance, *Manual control, *Simulation.

N66-14292 **Field 5H**
CFSTI Prices: HC$2.00 MF$0.50
Bunker-Ramo Corp., Canoga Park, Calif.
RESEARCH STUDY OF SPACECRAFT AND AIRCRAFT MANUAL CONTROL SYSTEMS THEORIES.
Final summary rept.
30 Apr 65, 37p
Contract NASw-869
NASA CR-68978

Descriptors: *Manual control, *Systems analysis, *Aircraft design, *Spacecraft design.

N66-17082 **Field 5H**
CFSTI Prices: HC$2.00 MF$0.50
Melpar, Inc., Falls Church, Va.
HUMAN PERFORMANCE CONTROL MONITORING SYSTEMS.
Interim rept. no. 2,
by J. M. Gervinski and R. E. 10bMirabelli. 15 Jan 66, 27p
Contract NASw-1085
NASA CR-70340

Descriptors: *Servocontrol, *Automatic control, *Computer program, *Human performance, *Manual control.

PB-169 327 **Field 5B**
CFSTI Prices: HC$2.60 MF$0.50
Harvard Univ., Cambridge, Mass. Graduate School of Business Administration.
STUDIES OF THE FLOW OF TECHNICAL INFORMATION. I. A SURVEY IN SELECTED INDUSTRIAL LABORATORIES. II. A SURVEY OF SELECTED MEMBERS OF THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS. III. STUDIES OF DECISION-MAKING IN DEVELOPMENT PROJECTS.
Interim rept.,
by Richard S. Rosenbloom and Francis W. Wolek. Jan 66, 26p
Grant NSF-GN-305
NSF Scientific Documentation Project. Prepared in cooperation with Wharton School of Finance and Commerce, Univ. of Pennsylvania, Pa.

Descriptors: (*Scientific research, Dissemination), Reports, Industries, Engineering personnel, Data, Decision making, Sources, Information retrieval, Analysis, Social communication.

Surveys of the flow of technical information, based on a self-administered questionnaire, were conducted in eighteen establishments of five industrial corporations and through four specialized groups in the Institute of Electrical and Electronics Engineers. The report describes the purposes, scope, and design of the surveys and discusses the framework for data analysis. A brief resume of findings is given, pending completion of a detailed technical report. Finally, several related studies of the decision-making process in development are described in brief. (Author)

PB-169 377 **Field 5B, 5I**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
FROM RESEARCH TO DEVELOPMENT TO USE.
Professional paper,
by Launor F. Carter. 17 Jan 66, 33p SP-2332
Prepared for presentation at a symposium in Chicago Illinois, February 20-21, 1966, sponsored by the American Educational Research Association - Phi Delta Kappa.

Descriptors: (*Documentation, Effectiveness), (*Scientific research, Dissemination), (*Education, Social communication), Systems engineering, Reports, Weapon systems, Management engineering.

The following conclusions were drawn: (1) Transition from research to development to use is not a straight-forward process. (2) The time lag between initial discovery and application is large. (3) Communication in research and development tends to be informal and largely on a person-to-person basis. (4) Ideas are pushed through to application at the location at which the ideas originate. (5) Strong leadership is essential. (6) Funding is not neatly controlled. (7) An adaptive rather than an authoritarian organizational environment was important.

PB-169 378 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
System Development Corp., Santa Monica, Calif.
PERPETUAL USER STUDIES, A PREREQUISITE FOR MANAGEMENT OF INFORMATION ON A NATIONAL SCALE,
by Lauren B. Doyle. 1 Feb 66, 18p SP-2105

Descriptors: (*Technical information centers, Management planning), (*Management planning, Documentation), Scientific personnel, Public opinion, Information retrieval, Effectiveness, United States Government.

A view is presented that current studies of technical information users are much too fragmentary to provide guidance for those planning for technical information service at a national level, and that nothing less than a census-scale monitoring of user behavior is needed. It is suggested that any plan for centralization of information handling be built around such a census. The concept of 'user control' as a kind of voting or market system based on user choices is developed. Attitudes toward the user among information specialists are noted as hazards to the idea of user control. Some 'burning questions' in the information field are given, the answers for which might come through large-scale user monitoring. (Author)

PB-169 421 **Field 5B**
CFSTI Prices: HC$2.60 MF$0.50
Western Reserve Univ., Cleveland, Ohio. Center for Documentation and Communication Research.
A FIELD EXPERIMENTAL APPROACH TO THE STUDY OF RELEVANCE ASSESSMENTS IN RELATION TO DOCUMENT SEARCHING.
Formal progress rept. no. 1, 1 Jul-31 Dec 65,
by Alan M. Rees and Douglas G. Schultz. 31 Dec 65, 25p
Contract NSF-C423

Descriptors: (*Information retrieval, Effectiveness), Search theory, Documentation.

Identifiers: Relevance (Documentation).

The first six months of this program have been utilized to formulate the research in terms of particular problems to be investigated and to develop experimental procedures for the solution of these problems in the framework of a specific research setting. Major variables selected for observation are relevance judges, document sets, document representations and research stages. (Author)

PB-169 430 **Field 5G**
CFSTI Prices: HC$1.60 MF$0.50
California Univ., Berkeley. Machine Translation Project.
THE LEXEME DE AS A SYNTACTIC MARKER,
by Ching-Yi Dougherty. Sep 64, 17p

Descriptors: (*Syntax, Chinese language), (*Chinese language, Machine translation), Analysis.

The paper is limited to the 'de' which functions as the nominalizer, defined as a lexeme which follows a noun, a verb, an adjective, a noun or verbal phrase, or a complete clause, such that the resulting construction is a noun phrase. (Author)

PB-169 431 **Field 5G**
CFSTI Prices: HC$6.60 MF$0.75
California Univ., Berkeley. Machine Translation Project.
CHINESE SYNTACTIC RULES FOR MACHINE TRANSLATION,
by Ching-Yi Dougherty and Samuel E. Martin.
Sep 64, 63p

Descriptors: (*Syntax, Chinese language), (*Chinese language, Machine translation), (*Machine translation, Chinese language), Grammar.

The purpose of the paper is to present the complexity of Chinese grammar in terms of simple grammatical rules written symbolically and capable of being subjected to such purely mechanical manipulations as those performed by a computer.

PB-169 662 **Field 5C**
CFSTI Prices: HC$2.00 MF$0.50
Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
COMPENDIUM OF FOREIGN PROGRAMS.
Apr 66, 32p STS-101

Descriptors: (*Economics, Government (Foreign)), Research program administration, Industries, Training, Universities, Scientific organizations, Scientific research, Canada, Denmark, France, Israel, Japan, Netherlands, Norway, Sweden, Great Britain, West Germany, Technical information centers.

Identifiers: Technical assistance, International organizations.

The Compendium was prepared to aid State planners in implementing the State Technical Services Act of 1965. Services and programs used by a selected group of foreign countries are surveyed. Their concepts in dealing with the problems of dissemination of technical information to industry are based on the Weste n, or--in the case of Japan--Western-oriented economic systems. The programs are generally characterized by a cooperative effort among central and local governments, universities, industry, and other private or semiprivate institutions, a view that is basic to the State Technical Services Act. Following a country-by-country survey, the Organization for Economic Cooperation is described, emphasizing activities that contribute to the exchange of scientific and technical information. A bibliography of research reports and other publications dealing with the dissemination of scientific and technical information is included, as well as sources where more information may be obtained about foreign programs. (Author)

PB-169 727 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Program Research, New York.
SYNOPSIS OF 3 AREAS: ANSONIA, FLAT RIVER, MEADVILLE, AND CONCLUSIONS.
May 63, 4p
See also PB-169 724 through PB-169 726.

Descriptors: (*Economics, Geography), (*Employment, Geography), (*Labor, Geography), Distribution (Economics), Industries, Manpower studies, Connecticut, Missouri, Pennsylvania, Commerce.

Identifiers: Area redevelopment.

All 3 areas are, in fact, on the way to recovery, although the way may be a long one for some of them Ansonia was being relieved by job expansion internally, even more by job expansion in surrounding towns. Flat River was proved by a strike to be no longer dependent on its mines. But a positive program has still to take shape. Meadville is attacking its many problems, and its chief industry is displaying inventiveness again. But the problems will not be solved in a year or two. But there are variations in muscle tone between them. The observations these variations illustrate may be summed up in the presence or absence of full time professional redevelopment men - Ansonia has no professional staff, not even part time Chamber of Commerce staff. The Mayors and First Selectmen all work for a living at something else. Flat River has County Directors of Extension. These full time resident staff men have nursed and strengthened the interest of area leaders in redevelopment. Meadville, with a $15,000 a year man paid from privately subscribed funds has a program that can be matched only in a few places.

PB-169 738 **Field 5C, 2B, 6H**
CFSTI Prices: HC$2.00 MF$0.50
Georgia Univ., Athens. Market Development Research Team.
PRESENT AND POTENTIAL OPPORTUNITIES FOR EGG PROCESSING IN GEORGIA.
Special rept.,
by E. Evan Brown, Boyd B. Rose, and David W. Culver. Jan 65, 35p
Prepared in cooperation with Department of Commerce, Washington, D. C. Area Redevelopment Admin.

Descriptors: (*Economics, Georgia), (*Eggs, Processing), (*Agriculture, Georgia), Chickens, Industries, Costs, Commerce, Labor, Wages, Meteorology, Food, Frozen foods, Dehydrated foods, Feasibility studies, Distribution (Economics).

Identifiers: Area redevelopment.

The specific problem investigated in this study is whether expansion of egg production in Georgia has progressed to the point where egg breaking is desirable or needed. What type of breaking lines would be most efficient in both the short and long run. What are the markets in which processed eggs from Georgia would have a competitive advantage over eggs from present surplus areas. There are three specific objectives for this study. These are as follows: (1) To determine the feasibility of processing eggs in Georgia from the viewpoint of supply and demand. (2) To determine how processing should be initiated if objective one proves feasible. (3) To determine the advantages and disadvantages that Georgia would have in processing eggs compared to the major processing area.

PB-169 744 **Field 5C, 8F, 8I, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Maine Dept. of Economic Development, Augusta.
TECHNICAL AND ECONOMIC FEASIBILITY OF ESTABLISHING A LIGHTWEIGHT AGGREGATE PLANT USING MARINE CLAYS IN YORK COUNTY, MAINE.
Final rept.
Jul 64, 78p
Contract Cc-6021

Descriptors: (*Economics, Maine), (*Clay, Maine), (*Composite materials, Clay), (*Industrial production, Composite materials), (*Industrial plants, Maine), Mixtures, Pellets, Concrete, Manufacturing methods, Clay minerals, Field spar, Quartz, Mica, Potassium compounds, Cement, Commerce, Natural resources, Transportation, Extrusion, Sintering, Feasibility studies, Mining engineering, Industries, Dryers (Apparatus), Crushers, Storage, Costs, Structural properties.

Identifiers: Area redevelopment, Aggregates (Materials).

Contents: Raw material resource investigation; Analysis and pilot plant tests; Estimates of construction and production costs, Economic feasibility of lightweight aggregate operation.

PB-169 745 **Field 5C, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Corplan Associates, Chicago, Ill.
AN ECONOMIC DEVELOPMENT STUDY FOR PORT CLINTON, OHIO.
Final rept.
Mar 65, 202p Q-6016
Prepared in cooperation with Dept. of Commerce, Washington, D. C. Area Redevelopment Admin.

Descriptors: (*Economics, Ohio), (*Industries, Ohio), (*Employment, Ohio), Commerce, Transportation, Labor, Law, Water supplies, Sewage, Urban planning, Recreation, Natural resources, Agriculture, Education, Chemical industry, Electronics, Steel industry, Vehicle accessories, Food, Processing, Seafood, Drugs, Air conditioning equipment, Electrical equipment.

Identifiers: Area redevelopment.

In late 1963, the City of Port Clinton, as well as the rest of Ottawa County, was faced with the closing of the nearby Erie Army Depot (EAD). The Depot has provided employment to many of the city and county's citizens for many years, and has acted as a basis for economic stability in the area. As originally proposed, the phase-out of EAD will be spread over a three-year period, thus providing local communities the time to develop and expand other types of economic activities to take the place of EAD. To assist Port Clinton and Ottawa County in its endeavors to generate new employment opportunities, the Area Redevelopment Administration of the U. S. Department of Commerce agreed to sponsor a research project consisting of two phases under its technical assistance program aimed at appraising the needs of the area and developing a program to help improve economic conditions. This report, which constitutes Phase I of the research project, reviews Ottawa County, and Port Clinton in particular, identifies the area's assets and limitations, appraises the potential for various kinds of economic activities in the area, and provides recommendations and a suggested plan of action for further development of economic activities within the city and county.

PB-169 746 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Maine Univ., Orono. Cooperative Extension Service.
FOREST SURVEY OF TIMBER RESOURCES, WASHINGTON COUNTY, MAINE.
9 Jul 64, 44p
Prepared in cooperation with Department of Commerce, Washington, D. C. Area Redevelopment Admin. Includes Technical Assistance Proj. summary no. 799.

Descriptors: (*Economics, Maine), (*Forestry, Maine), (*Recreation, Maine), (*Employment, Maine), Natural resources, Commerce, Woodpulp, Wood, Labor, Population, Feasibility studies, Costs, Industries, Geography.

Identifiers: Area redevelopment.

Contents: (1) Forest survey of timber resources of Washington County, Maine. (2) Feasibility and site analysis and preliminary facility plans for a major resort complex at Milbridge and Trunk Lake, Maine, to be known jointly as 'ACADIA.'

PB-169 747 **Field 5C, 2B, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Georgia Univ., Athens. Market Development Research Team.

ECONOMIC DATA RELATED TO THE FEASIBILITY OF ESTABLISHING A PLANT TO PROCESS PINE BARK AND COW MANURE FOR SOIL AMENDMENTS.
Special rept.,
by Boyd B. Rose, E. Evan Brown, and David W. Culver. Jan 65. 29p
Prepared in cooperation with Department of Commerce, Washington, D. C. Area Development Admin.

Descriptors: (*Economics, Georgia), (*Industrial plants, Georgia), (*Soils, Additives), (*Additives, Preparation), Feasibility studies, Soil mechanics, Wood, Forestry, Fertilizers, Industries, Excretion, Bovines, Natural resources, Distribution (Economics), Costs, Agriculture, Commerce.

Identifiers: Area redevelopment, Soil amendments, Feces.

The report contains data relative to the establishment and operation of a plant to process pine bark and composted cow manure for use as a soil amendment. Initiation of this study resulted from recommendations based on findings of research in the Central Savannah River Planning and Development Commission Area of Georgia conducted by the Market Development Research Team in the Department of Agricultural Economics, University of Georgia and reported in Bulletins N. S. 112 and N. S. 116. This study was financed by a contract with the Area Redevelopment Administration and the United States Department of Commerce, Washington, D. C. purchase order P 363-5. It is divided into four major sections: Plant construction and operation, raw material supply, distribution of competing products, and market and potential demand.

PB-169 748 **Field 5C, 5I, 5A**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania Power and Light Co., Wilkes-Barre.
A KEY TO GREATER INDUSTRIAL HARMONY AND ECONOMIC PROSPERITY - LABOR-MANAGEMENT-CITIZENS COMMITTEES - EXHIBIT II.
1965. 46p

Descriptors: (*Economics, Pennsylvania), (*Industrial relations, Pennsylvania), (*Labor unions, Pennsylvania), (*Bargaining, Industrial relations), Industries, Labor, Public relations, Management engineering, Food, Processing, Wood, Textile industry, Transportation, Leather, Education, Employee relations.

Greater Wilkes-Barre, through the operation of its Labor-Management-Citizens Committee, has achieved a healthier industrial climate. This brief statement of fact is based on the results achieved by a group of individuals who have banded themselves together to do something about the area's undeserved reputation of having troubled labor-management relations. The fact that the area's labor-management relations are far better than in many other parts of the country does not remove the false reputation sometimes attached to the area in the minds of many industrialists, and other citizenry alike, in the other sections of our country. Greater Wilkes-Barre's plan for greater industrial harmony is a plan of positive action -- a plan that may well serve as a guide for other communities or areas which may share such a reputation or for those communities or areas that want to maintain and improve an already healthy industrial climate. Through the full cooperation of the Greater Wilkes-Barre's Labor-Management-Citizens Committee, this report has been prepared so that all section of Central Eastern Pennsylvania may gain from its initiative, its enthusiasm, its experience and its success.

PB-169 750 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Sno-Engineering, Inc., Franconia, N. H.
THE SKIER MARKET, NORTHEAST NORTH AMERICA.
Market research study,
by Selden J. Hannah and Theodore A. Farwell, Jr. 6 Dec 63. 124p
Contract Cc-5988

Descriptors: (*Economics, North America), (*Recreation, Economics), (*Mountains, Recreation), Geography, Commerce, Pennsylvania, West Virginia, Maryland, Quebec, New York, Massachusetts, Connecticut, Rhode Island, Maine, New Hampshire, Vermont, Employment, Skis, Statistical data, Feasibility studies, Distribution (Economics).

Identifiers: Skiing, Area redevelopment.

The objectives of this study were: (1) To determine the size of the skier market. (2) To determine the short term growth trend of the skier market. (3) To determine selected preferences, habits and socio-economic characteristics of the skier market. A summary of the findings of this study are: (1) There are approximately 447,600 skiers in this skier market. (2) 19.5% or some 87,000 skiers were skiing for the first time in 1962-63. 59.6% or some 267,000 skiers have skied less than five years. (3) The number of skiers comprising the market have grown at some rate not in excess of 16.7% annually. (4) 36.7% of the market reside in the Connecticut, Southeast New York state, and New Jersey and Eastern Pennsylvania 'Megalopolis'. 17.4% of the market reside in the Eastern Massachusetts and Rhode Island metropolitan region. 11.1% of the market reside in the Montreal metropolitan region. (5) Skiers participate an average of 12.7 days annually. (6) There were approximately 7,920,000 skier-days of skiing accomplished by these 447,600 skiers during the 1962-63 season. 1,090,000 days by vacation skiers. 4,950,000 days by weekend skiers. 1,880,000 days by mid-week skiers. Two general conclusions are: (1) There is need for additional ski facilities designed and located to meet the present demand for weekend and holiday skiing. (2) There is at present an over-capacity of facilities designed and operated to cater to vacationing skiers.

PB-169 751 **Field 5C, 8F, 11L**
CFSTI Prices: HC$3.00 MF$0.75
McNew (George J.), Fort Worth, Tex.
FEASIBILITY STUDY (OF) WARRENTON, WARREN COUNTY, GEORGIA, FURNITURE PLANT.
Jan 64. 68p
Contract Cc-6038

Descriptors: (*Economics, Georgia), (*Industries, Georgia), (*Wood, Industries), Population, Natural resources, Commerce, Transportation, Power supplies, Sewage, Water supplies, Forestry, Education, Law, Feasibility studies, Labor, Costs, Employment.

Identifiers: Area redevelopment, Furniture.

Briefly stated, the information developed throughout the Feasibility Study pertains to subjects embraced by the: Overall Economic Situation; Availability of Materials; Sales of the Prospective Company's Products; The Manufacturing Function; and Items Related to Costs and Profitable Operation. Warren County, having the physical and geographic situation reported here, possesses the possibilities of a progressive and thriving business. We believe that, under the appropriate circumstances, there can be and should be a successful furniture operation instituted. (Author)

PB-169 753 **Field 5C, 8F**
CFSTI Prices: HC$4.45 MF$2.00
Booker (R. W.) and Associates, Inc., St. Louis, Mo.
KENTUCKY INDUSTRIAL SITES: BARBOURVILLE, CORBIN, CUMBERLAND, ELKHORN, HARLAN, HAZARD, HINDMAN, HYDEN, INEZ, LOUISA, MIDDLEBORO, PAINTSVILLE, PIKEVILLE, PINEVILLE, PRESTON- BURG, SALYERSVILLE, WHITESBURG AND WILLIAMSBURG.
1966. 444p
Prepared in cooperation with Dept. of Commerce, Washington, D. C.

Descriptors: (*Economics, Kentucky), (*Industries, Kentucky), (*Industrial plants, Geography), Population, Labor, Wages, Transportation, Recreation, Natural resources, Employment, Commerce, Management planning.

Identifiers: Area redevelopment.

Technical assistance studies approved by the Area Redevelopment Administration to identify potential industrial sites in various redevelopment areas of Kentucky.

PB-169 755 **Field 5C, 13B, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ernst and Ernst, Cleveland, Ohio.
AREA REDEVELOPMENT ADMINISTRATION REPORT OF COMMUNITY DEVELOPMENT PROGRAM FOR DUNKIRK AND FREDONIA, NEW YORK,
14 Mar 63. 86p
Contract Cc-5980

Descriptors: (*Economics, New York), (*Urban planning, New York), (*Employment, New York), (*Industries, New York), Commerce, Labor, Costs, Water supplies, Population, Transportation, Sanitary engineering, Sewage, Power supplies, Education, Recreation, Meteorology.

Identifiers: Area redevelopment.

Contents: Proposed program for Dunkirk-Fredonia Coordinating Group. Summary of origin and economic activities of the Northern Chautauqua Area Development Corporation, and predecessor organizations: Comments regarding land and buildings of Alco Products, Inc.; Comments regarding possible emergency actions to conserve skill resources in area; and Comments regarding the Northern Chautauqua Area Development Corporation.

PB-169 756 **Field 5C, 8F, 8I, 13H**
CFSTI Prices: HC$4.00 MF$0.75
Spindleton Research Center, Lexington, Ky.
FEASIBILITY OF ESTABLISHING A CLAY PROCESSING PLANT IN MARSHALL COUNTY, KENTUCKY.
Final rept.,
by William J. Evans and Gary R. Gates. 1 Oct 64. 104p
Contract Cc-6030

Descriptors: (*Economics, Kentucky), (*Clay, Processing), (*Industrial plants, Kentucky), Economic geology, Mining engineering, Natural resources, Employment, Costs, Labor, Distribution (Economics), Geography, Commerce, Feasibility studies, Manufacturing methods, Clay minerals, Absorption, Bleaching agents.

Identifiers: Area redevelopment.

A study was made to establish the technical and economic feasibility for a fuller's earth products plant in Marshall County. Determinations were made of: the quality, quantity, uniformity and accessibility of the fuller's earth deposits; the kinds of products that can be made from the raw materials; the demand and price for these products; projected net sales; the optimum-sized plant to produce the most promising products; capital requirement for mine and plant; plant operating costs; sales costs; profitability based on the above factors. The feasibility study indicated that a 60-ton per day plant to produce floor absorbents and soil conditioner is justified. A mechanised plant capable of manufacturing highest quality products at low cost is necessary for profitable operation.

PB-169 757 **Field 5C, 2F, 8F, 11L**
CFSTI Prices: HC$3.00 MF$0.75
Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.
FOREST RESOURCES AND FOREST INDUSTRIES FOR NORTHEAST WASHINGTON,
by Philip A. Briegleb. Jan 64, 96p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Washington (State)), (*Forestry, Washington (State)), (*Industries, Wood), Trees, Natural resources, Wood pulp, Paper industry, Labor, Composite materials, Recreation, Geography, Commerce.

Identifiers: Area redevelopment.

This report presents and interprets basic information on the forest resources of northeast Washington collected as a part of the Forest Survey conducted by the Forest Service. This information consists of data on forest land area, timber volume, timber harvest, and timber growth by kind, character and condition, and ownership class. The forest resource data are supplemented by information on the timberbased industries, their relation to the forest as a source of raw material, other forest products and values, and pertinent other economic data. For the purposes of this report northeast Washington is defined as consisting of Ferry, Lincoln, Pend Oreille, Stevens, Spokane, and Whitman Counties.

PB-169 758 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Bloch (Ivan) and Associates, Portland, Oreg.
PRELIMINARY STUDY OF INDUSTRIAL SITES IN THE UPPER PUGET SOUND AREA WASHINGTON,
by Ivan Bloch. 26 Dec 62, 84p
Contract Cc-5832
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Washington (State)), (*Industries, Washington (State)), Transportation, Oregon, Idaho, Montana, Wood, Wood pulp, Paper, Natural resources, Food, Seafood, Processing, Agriculture, Refineries, Aluminum, Sounds, Copper, Steel industry, Power supplies, Water supplies, Rivers, Commerce.

Identifiers: Area redevelopment.

This preliminary study relates to industrial sites both in existence and in the planning and development stage in the Puget Sound area, near Anacortes, including Padilla Bay, and in relation to those in the area ranging from Ferndale district north of Bellingham, Washington to the Everett area (Mukilteo), on and immediately adjacent to waters of Puget Sound itself.

PB-169 759 **Field 5C, 8F, 13C, 13H**
CFSTI Prices: HC$4.00 MF$1.00
Spindletop Research Center, Lexington, Ky.
FEASIBILITY OF ESTABLISHING A STRUCTURAL CLAY PRODUCTS PLANT IN ESTILL COUNTY, KENTUCKY.
Final rept.,
by James A. Street and William J. Evans. 28 Mar 63, 133p Rept. no. T-201-2
Contract Cc-5977

Descriptors: (*Economics, Kentucky), (*Clay, Processing), (*Industrial plants, Kentucky), (*Brick, Industrial production), Natural resources, Commerce, Labor, Power supplies, Fuels, Transportation, Geography, Ceramic materials, Experimental data, Distribution (Economics), Shale, Mining engineering, Employment, Manufacturing methods, Tests, Industries, Structural properties, Costs, Economic geology.

Identifiers: Area redevelopment.

Contents: Estill county clay resources; Power and fuel; Labor analysis; Plant site selection; Transportation; Market analysis; and Cost analysis.

PB-169 760 **Field 5C, 2F, 8F, 11L**
CFSTI Prices: HC$3.00 MF$0.75
Pacific Northwest Forest and Range Experiment Station, Portland, Oreg.
FOREST RESOURCES AND FOREST INDUSTRIES FOR NORTHWEST OREGON,
by Philip A. Briegleb. Dec 64, 81p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Oregon), (*Forestry, Oregon), (*Wood, Industries), (*Industries, Oregon), Plywood, Laminates, Wood pulp, Paper, Composite materials, Trees, Natural resources, Commerce, Transportation, Labor, Industrial production.

Identifiers: Area redevelopment.

Based upon findings of a national analysis of demand for wood products in the framework of the timber supply situation, a moderate decline in lumber production is expected in northwest Oregon over the next several decades. During this period a moderate increase in production of veneer and plywood and a substantial increase in production of pulp and paper and wood-fiber board is anticipated in this area. During the next few years some increase in hardwood lumber production is expected, but this will be limited by economic availability of logs and competition from pulpmills and existing hardwood lumber manufacturers for available logs. Veneer and plywood production is expected to increase during the next few years in this area at the expense of lumber manufacture or through withdrawal of logs from other areas. Pulp and paper manufacture will increase, but it will have to be based upon thinnings and other low-cost roundwood or on fine mill residues. Secondary wood-using industries such as lumber remanufacture, wood specialities, laminated beams, trusses, etc., wood chemical plants and converted paper products offer good possibilities for industrial expansion in northwest Oregon owing to locational advantages in this area and nearness to growing consumer markets. (Author)

PB-169 761 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Kearney (A. T.) and Co., Chicago, Ill.
WALKER COUNTY STUDY REPORT ON PHASES I AND II FOR MARCH 18-JUNE 17, 1963.
5 Sep 63, 154p
Contract Cc-6004
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Alabama), (*Employment, Alabama), (*Industries, Alabama), Transportation, Wood, Coal, Clay, Brick, Commerce, Wood pulp, Population, Paper industry, Power supplies, Television equipment, Natural resources, Minerals, Water supplies.

Identifiers: Area redevelopment, Furniture.

Two phases of the work in connection with the study of the potential for economic expansion in Walker County, Alabama have been completed: Phase I - Select three to five local enterprises having the greatest potential for expansion; Phase II- Provide detailed analysis and recommendations with respect to these companies.

PB-169 762 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Sewell and Associates, Inc., Savannah, Ga.
POTENTIAL INDUSTRIAL PARK FACILITIES AND RELATED TRANSPORTATION SERVICES.
Sep 63, 87p
Contract Cc-6002
Prepared in cooperation with Screven County Redevelopment Corp., Sylvania, Georgia and Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Georgia), (*Industries, Georgia), Employment, Transportation, Natural resources, Minerals, Wood, Agriculture, Wood pulp, Labor, Power supplies, Commerce, Population, Roads, Railroads, Air transportation, Costs, Water supplies.

Identifiers: Area redevelopment, Industrial parks.

The purpose of this report and the studies involved in its presentation has been to determine potential values for industrial development of certain areas and sites within Screven County, Georgia. Within the scope of the report has been determination of transportation facilities available including highway, rail, air and water transport. In assessing the potential of the sites studied, the report has included consideration of accessibility of utility services, water supply (including process water), electric power, natural gas, etc. Resources of Screven County reviewed in this study have included agricultural products, mineral, timber, pulpwood, labor supply, and other pertinent items. Consideration has been given to availability of resources from adjoining counties within the sphere of influence of Screven County. During the preparation of the report, it has become evident that there are many potential industrial park sites within Screven County with comparable developmental values. The sites described in some detail in the report are considered typical of the County as a whole in regard to acquisition costs, development costs, etc. It has become evident that excellent potential industrial sites exist in Screven County, with transportation, utilities and services readily accessible. There exist considerable resources in both materials and labor for the establishment of industry, both within Screven County and the immediately adjacent service area.

PB-169 763 **Field 5C, 8F, 8I, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Spindletop Research Center, Lexington, Ky.
FEASIBILITY OF ESTABLISHING A CLAY PROCESSING PLANT IN MARSHALL COUNTY, KENTUCKY. PART I. TECHNICAL FEASIBILITY,
by William J. Evans and Gary R. Gates. 31 Oct 63, 71p
Contract Cc-6030

Descriptors: (*Economics, Kentucky), (*Clay, Processing), (*Industrial plants, Kentucky), Economic geology, Mining engineering, Natural resources, Employment, Costs, Labor, Distribution (Economics), Geography, Commerce, Feasibility studies, Manufacturing methods, Clay minerals, Absorption, Bleaching agents.

Identifiers: Area redevelopment.

This study, to determine the quality and quantity of two clay deposits near Benton, Kentucky, is the technical portion of a more comprehensive project to evaluate the technical and economic feasibility of a clay processing plant in Marshall County, Kentucky.

PB-169 764 **Field 5C, 8F, 1E**
CFSTI Prices: HC$3.00 MF$0.75
Layton, Layton and Associates, St. Louis, Mo.
A FEASIBILITY STUDY FOR AN INDUSTRIAL PARK IN MOUNTAIN VIEW, MISSOURI,
by Emmet Layton. 13 Aug 63, 47p PR-30
Contract Cc-6023,
Proj. 402
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Missouri), (*Industries, Missouri), (*Airports, Missouri), (*Employment, Missouri), Labor, Textile in-

dustry, Transportation, Roads, Wood, Terrain, Natural resources, Housing, Hospitals, Sewage, Water supplies, Recreation, Power supplies, Soils.

Identifiers: Area redevelopment.

The City of Mountain View has annexed the Industrial Park in order to provide essential service and adequate airport controls. They have accepted the Mountain View Resources and Development Corporation's gift of enough land to develop a Memorial Airport, for which approval and funds have been received from FAA and the State of Missouri, with construction to start immediately. They have created a Department of Parks and Recreation to construct and maintain a nine hole golf course surrounding the flight strip, which the Corporation has also donated. A joint air terminal and club house building will serve both facilities and guarantee maintenance of their mutual grounds. This self-sustaining, joint venture is an integral part of the Industrial Park, occupying about one hundred acres adjoining a proposed Angelica Uniform Factory site.

PB-169 765 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Area Redevelopment Administration, Washington, D. C.
OUTDOOR RECREATION, A FIELD OF OPPORTUNITY FOR REDEVELOPMENT,
Area redevelopment tech. leaflet.
13 Feb 62, 16p Rept. no. 2

Descriptors: (*Economics, Recreation), (*Recreation, Economics), Commerce, Natural resources, Manage ment planning, Costs, Employment, Geography.

Identifiers: Area redevelopment.

The purpose of this leaflet is to suggest to Redevelopment Areas the scope of this opportunity in recreational development. It is intended to show some of the forms development can take and some of the procedures to follow. It is not intended to supplant the kind of expert advice and detailed planning necessary for the careful development of any specific program.

PB-169 766 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Program Research, New York.
FIVE-COUNTY REDEVELOPMENT AREA IN SOUTHEASTERN MISSOURI COMPOSED OF THE COUNTIES OF STE. GENEVIEVE, ST. FRANCOIS, WASHINGTON, MADISON, AND IRON,
by Sidney Jeffers. Jul 62, 90p

Descriptors: (*Economics, Missouri), (*Employment, Missouri), (*Industries, Missouri), Mining engineering, Automation, Agriculture, Lead, Ores (Metal sources), Iron, Commerce, Transportation, Recreation, Minerals, Labor, Urban planning.

Identifiers: Area redevelopment.

Summary - (1) Reasons for present unemployment: Decline of mining industry; Automation of mining industry; Decline of family-sized farms and unsuitability of much of land for row-cropping. (2) Trends toward more unemployment: Old Lead Belt mines will continue to decline; New mines will be more automated; Barite mines are declining. (3) Trends toward more employment: Opening of Meramec Mining Company iron ore mine will aid slightly; Several area soft-goods industries plan expansion in near future.

PB-169 767 **Field 5C, 8F, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Moore (W. S.) Co., Hibbing, Minn.
HOT BRIQUETTING PROCESS PILOT PLANT OPERATION APPLIED TO MINNESOTA MESABI AND VERMILLION RANGE IRON ORE FINE CONCENTRATES,
by V. G. Etem. 15 Jun 64, 17p
Prepared in cooperationwith Area Redevelopment Administration, Washington, D. C. and State of Minnesota Iron Range Resources and Rehabilitation Commission.

Descriptors: (*Economics, Minnesota), (*Pellets, Ores (Metal sources)), (*Ores (Metal sources), Minnesota), (*Iron, Ores (Metal sources)), Iron industry, Blast furnaces, Experimental data, Hot working, Composite materials, Manufacturing methods, Industrial production, Simulation, Mining engineering, Industrial equipment, Presses (Machinery), Costs.

Identifiers: Area redevelopment, Briquets.

Objectives of the study where: (1) To determine whether iron ore briquets having the desired physical characteristics to make them suitable as a blast furnace feed can be produced from Minnesota fine iron ore concentrates and (2) To determine the cost of briquetting press maintenance; this being the basic unknown in projecting briquetting costs. Continuous production, insofar as possible, simulating the conditions that would exist in a commercial plant, was planned. Experimental runs were conducted to evaluate the effect of different operating conditions on briquet quality. It was found that press maintenance costs were prohibitive. Roll insert wear alone cannot be projected lower than $1.50 per ton of briquets for a commercial installation. Briquet quality, as measured by standard A. S. T. M., 200 revolutions, tumble tests, was substantially inferior to that of iron ore pellets.

PB-169 768 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Checchi and Co., Washington, D. C.
TOURISM AS A JOB CREATOR. A FIRST STAGE PROGRAM FOR THE NEW RIVER GORGE COUNTRY OF WEST VIRGINIA.
Jun 62, 62p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, West Virginia), (*Recreation, Economics), (*Employment, West Virginia), Commerce, Lakes, Costs, Labor, Mountains, Population, Geography.

Identifiers: Area redevelopment, Tourist industry.

A development program was prepared for four counties in south-central West Virginia (as used in this report, the term 'New River Gorge Country' refers to these four counties: Fayette, Raleigh, Summers, and Mercer). All four counties suffer from severe and chronic unemployment. Consequently, the purpose in preparing such a program has been to determine how to create permanent jobs. The area's primary tourism assets are its location with respect to markets and its elevation. If water projects could be added to mountains and climate, it would make it possible to develop resorts that would attract pleasure and business travel and the area could tap a market of 3.7 million wage earners who live within 500 miles. But to succeed, such resorts must be bolstered by supplementary tourist attractions and activities, and must be backed by an overall tourism program including promotion. Three resort projects can be developed right away at Stephens Lake in Raleigh County, Plum Orchard Lake in Fayette County, and Bluestone Lake in Summers County. These lakes either exist or are in an advanced stage of construction. Each has promising resort sites. And each is large enough and attractive enough to warrant serious and immediate attention as an important tourist attraction.

PB-169 769 **Field 5C, 8F, 13J**
CFSTI Prices: HC$3.00 MF$1.00
Stanley Engineering Co., Cleveland, Ohio.
REPORT ON OHIO RIVER PUBLIC DOCK FOR CITY OF PORTSMOUTH AND SCIOTO COUNTY, OHIO REGION,
by Proctor Noyes. 11 Feb 64, 65p
Contract Cc-6003
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Ohio), (*Piers, Ohio), (*Shipping (Marine), Piers), Commerce, Rivers, Cargo, Water traffic, Feasibility studies, Storage, Costs, Site selection, Transportation, Industries.

Identifiers: Area redevelopment.

This report presents the results of studies to determine the feasibility of a multi-purpose public dock facility for handling freight on the Ohio River near Portsmouth in Scioto County, Ohio. The prospective service area of a public dock near Portsmouth includes south central Ohio and northeast Kentucky. This service area does not contain any major industrial complexes other than those located along the Ohio River most of which operate private single-purpose dock facilities. Prospective freight for the proposed dock facility is estimated to be concentrated about products produced or consumed in the immediate Portsmouth-New Boston industrial area. A large part of the freight traffic that could be handled by a public dock facility near Portsmouth is presently handled by private facilities in the area. Without diversion of freight traffic from these private facilities, prospective tonnages are not sufficient to support the installation and operation costs of the proposed dock. Project cost is estimated at $500,000 and an additional $20,000 is required for working capital. A benefit-cost comparison yields a benefit-cost ratio of 0.57. However, if Detroit Steel Company closes its dock facilities and diverts its river traffic through the proposed project, a benefit-cost ratio exceeding 1.42 and a viable dock operation can be assured. (Author)

PB-169 770 **Field 5C, 6H, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Agri Research Inc., Manhattan, Kans.
ECONOMIC FEASIBILITY OF A NAVAJO LIVESTOCK SLAUGHTERHOUSE,
Nov 62, 120p
Contract 14-20-0650-1048
Prepared in cooperation with Bureau of Indian Affairs, Washington, D. C.

Descriptors: (*Economics, New Mexico), (*Meat, Processing), Feasibility studies, Industrial plants, Animals, Costs, Industries, Commerce, Employment, Food, Industries.

Identifiers: Navajo reservation, Area redevelopment.

On the basis of presently-existing conditions with regard to the supply of livestock for slaughter and the demand for mutton, lamb and chevon on the Navajo Reservation, it was concluded that the construction of a modern, commerical meat packinghouse of sufficient size to ensure efficient operation and to provide an appreciable addition to employment opportunities on the Reservation, could not be economically justified at the present time. In order for a meat packinghouse to be an economically feasible operation on the Navajo Reservation, certain minimum requirements must be met: An adequate supply of slaughter livestock must be available throughout the year. A dependable and adequate 'on Reservation' demand must be assured for the total output of the packinghouse. The total cost, exclusive of land, for a basic commercial packinghouse with a killing capacity of 2000 head of sheep, lambs and goats would be approximately $200,000. When in operation, this plant would have to kill at a rate of 88 percent of weekly capacity to break even. Based on a total kill of 100,000 head of sheep, lambs and goats per year, under present price and cost conditions, this plant should produce an annual sales revenue of approximately $1,213,403 per year at a total annual cost of approximately $1,172,800 for a net profit before taxes of $40,603.

PB-169 771 **Field 5C, 8F, 13B**
CFSTI Prices: HC$4.00 MF$0.75
Community Planning Services, Inc., Monroeville, Pa.
OUTLINE OF PROTOTYPE ZONING ORDINANCE. I. PROPOSED LAND SUBDIVISION REGULATIONS. II.
Dec 63, 103p
Report on the Prince Gallitzin Regional Plan Cambria County, Pennsylvania (Suppl.). Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. and Pennsylvania Dept. of Forests and Waters and the Cambria County Tourist Council.

Descriptors: (*Economics, Pennsylvania), (*Urban planning, Law), (*Site selection, Law), (*Housing, Law), Standards, Soils, Grasses, Pavements, Sanitary engineering, Roads, Geography, Materials, Construction, Industries, Factories, Commerce.

Identifiers: Area redevelopment, Zoning ordinances, Land.

Section 1 of this document is an outline of the contents of a prototype zoning ordinance to be recommended as a guide to the participating townships. The text of the ordinance, along with the maps, should be prepared for further study by the local township supervisors and their advisors. This outline will serve as the basis for initiating the study procedure with a Regional Planning Commission, should one be formed, and with the local planning commissions. Certain policy decisions of a regional nature have been developed in this report. These should be reviewed and explained to the officials of the participating townships, to serve as reference for the necessary local zoning policy decisions. This section has been drafted in generalized outline form for ease of presentation and understanding. It should be understood that the final draft of the text of each local zoning ordinance would need more precise and definitive wording, and preparation in proper legal form. Section 2 of this document is an outline of prototype land subdivision regulations recommended for use by the five townships in the Prince Gallitzin Region.

PB-169 772 **Field 5C, 8F, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Austin Co., Cleveland, Ohio.
THE SUITABILITY OF THE WRITTEN PROPERTY FOR DEVELOPMENT AS A MAJOR INDUSTRIAL SITE.
31 Jan 63, 84p
Contract Cc-5954
Availability: Prepared in Cooperation with S. W. Jack Drilling Co., Avonmore, Pa. and Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Ohio), (*Site selection, Industrial plants), (*Industrial plants, Ohio), Roads, Soils, Rivers, Floods, Water supplies, Power supplies, Transportation, Salts, Costs, Feasibility studies, Coal, Natural resources, Sanitary engineering, Sewage.

Identifiers: Area redevelopment.

The Witten property is suitable for development as a site for major industrial plant facilities. It offers in one large site - up to 885 acres with 4 miles of river, highway and rail frontage - the important economic advantages of barge transportation, relatively low cost power, favorable tax rate and tax climate and low cost fuel from the working coal deposits nearby. The Ohio River will provide virtually unlimited quantities of water immediately adjacent to the site. Natural gas is also available in the area. High quality salt deposits, that underlie the entire property, are an excellent raw material source for bringing operations. Location of this site, remote from any heavily built up industrial or residential area, and ownership of the entire river bottom, including land on both sides of the highway, will provide complete environmental control of the site surroundings. The occupant of the site will have to provide his own sewage treatment facilities and water supply system. Although power, rail and gas service do not exist at the site at this time, the extension of these services can be accomplished in time to satisfy the occupant's building program schedule.

PB-169 773 **Field 5C, 8F, 1E**
CFSTI Prices: HC$3.00 MF$0.75
Brown Engineers, New York.
FEASIBILITY STUDY FOR AN INDUSTRIAL PARK DEVELOPMENT AND AN ADJUNCT GENERAL AVIATION AIRPORT IN THE BRISTOL-PLYMOUTH LABOR MARKET AREA IN THE STATE OF CONNECTICUT.
Mar 64, 61p
Contract Cc-5990

Descriptors: (*Economics, Connecticut), (*Airports, Connecticut), (*Industries, Connecticut), Labor, Population, Site selection, Roads, Industrial plants, Employment, Costs.

Identifiers: Area redevelopment, Industrial parks.

The development of an industrial park and adjunct general aviation airport is the most realistic method of improving the economic viability of the Bristol-Plymouth area. The development of an industrial park on the 448-acre Town Hill site could provide 36 industrial sites of ten acres each. This could create a potential of 4,300 industrial jobs upon the successful completion of the project. Usually, 100 industrial jobs creates a minimum of 65 new jobs in the non-manufacturing sector. On the basis of the findings of this study, it can be concluded that although the industrial park might ultimately create 4,300 industrial jobs, the total number of new jobs could exceed 7,100. Of these, 2,800 would be non-manufacturing jobs. The need for an airport in this area of the State has been acknowledged by the local towns and cities, the State, and the Federal governments. All previous reports, as well as this report, recognize this need.

PB-169 774 **Field 5C, 2F**
CFSTI Prices: HC$3.00 MF$0.50
Greenacres, Inc., Seattle, Wash.
FOREST INVENTORY ACOMA PUEBLO FOREST LANDS, NEW MEXICO.
Rept. for 29 Jun 64-29 Apr 65,
by K. E. Beil. 26 Feb 65, 53p
Contract Cc-6173
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, New Mexico), (*Forestry, New Mexico), Natural resources, Trees, Data, Wood, Tables.

Identifiers: Area redevelopment.

The objective of this project was to provide the Bureau of Indian Affairs with reliable basic data on the forest resource. With this data, forest management objectives can be formulated and a basis for wise use of the forest resource is available. The feasibility of a use facility such as a sawmill can be established. The social and economic benefits of this project can be substantial, and it is hoped they will be. The project involved the various activities necessary to determine the quantity and condition of the timber resource including timber stand typing, mapping, and forest inventory.

PB-169 775 **Field 5C, 2F, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Greenacres, Inc., Seattle, Wash.
FOREST INVENTORY SANTA CLARA PUEBLO FOREST LANDS NEW MEXICO.
Rept. for 29 Jun 64-29 Apr 65,
by K. E. Beil. 26 Feb 65, 126p
Contract Cc-6173
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, New Mexico), (*Forestry, New Mexico), Data, Natural resources, Wood, Trees.

Identifiers: Area redevelopment.

The objective of this project is to provide the Bureau of Indian Affairs with reliable basic data on the forest resource. With this data, forest management objectives can be formulated and a basis for wise use of the forest resource is available. The feasibility of a use facility such as a sawmill can be established. The social and economic benefits of this project can be substantial, and it is hoped they will be. The project involves the various activities necessary to determine the quantity and condition of the timber resource including timber stand typing, mapping, and forest inventory.

PB-169 776 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Ohio Univ., Athens. Coll. of Commerce.
PRODUCT DEVELOPMENT FOR SOUTHEASTERN OHIO.
Final rept.
Jan 64, 91p
Contract Cc-5951
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Ohio), (*Industries, Ohio), (*Employment, Ohio), Transportation, Coal, Clay, Population, Natural resources, Labor, Wood, Manage ment engineering, Plastics, Synthetic rubber, Chemical industry, Instrumentation, Metals, Aluminum, Commerce, Steel, Recreation, Containers, Food, Forestry, Industrial Production.

Ohio University has completed a one-year effort to assist in the economic revitalization of Southeastern Ohio. That experience has enabled it to arrive at a number of surprising conclusions. The attempt to attract outside industry and stimulate expansion of local industry by identification of products suitable for production in a given area is one of the least effective and most expensive methods for promotion of economic development. This approach has so little chance of success that it would be imprudent to pursue it further. The picture is not a disappointing one, however. One of the most interesting and exciting discoveries made as a result of the project is that enough potential exists in the area itself to solve all of the unemployment problems. That potential needs to be developed. It can be developed if short term assistance is made available to small business and industry. Most area companies are at a critical stage in their development. They are ready to expand from the small business phase to the medium size business phase but they do not have the management that can guide them to expansion. What they need is a whole range of management services to guide them during an interim period, to get them 'over the hump' to that point where their production will justify the use of expert management services. (Author)

PB-169 777 **Field 5C, 13H, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Oklahoma Univ., Norman. Bureau of Business Research.
THE ECONOMIC FEASIBILITY OF A GALVANIZED PRODUCTS PLANT IN OKMULGEE, OKLAHOMA.
Dec 62, 43p
Contract Cc-5913
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Oklahoma), (*Industrial plants, Oklahoma), (*Zinc coatings, Industrial production), Employment, Natural resources, Transportation, Commerce, Feasibility studies, Steel, Iron, Sheets, Metal plates, Costs.

Identifiers: Area redevelopment.

A study was made to determine the economic feasibility of a plant to be located in Okmulgee, Oklahoma, for a galvanizing plant. The profitabili-

ty, employment, raw materials, and long range outlook of the proposed plant are the factors upon which its desirability depends.

PB-169 778 **Field 5C, 8F, 6H, 11G**
CFSTI Prices: HC$3.00 MF$0.75
Little (Arthur D.) Inc., Cambridge, Mass.
AN EVALUATION OF THE FEASIBILITY OF NATIVE INDUSTRY IN NORTHWESTERN ALASKA,
Sep 63, 100p C-64870
Prepared in cooperation with Bureau of Indian Affairs.

Descriptors: (*Economics, Alaska), (*Industries, Alaska), Feasibility studies, Commerce, Mammals, Meat, Processing, Packaging, Containers, Agriculture, Radioactivity, Fur, Tanning, Leather, Costs, Seafood, Fishes, Industrial plants, Geography.

Contents: Part one-The feasibility of establishing a commercial reindeer operation in arctic Alaska; Part two-The feasibility of fur farming in northwestern arctic Alaska; Part three-The feasibility of tanning hides and dressing pelts in northwestern artic Alaska; Part four-The feasibility of commercial processing of Sheefish.

PB-169 779 **Field 5C, 2B, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Montana State Coll., Bozeman. Dept. of Agricultural Economics.
THE FEASIBILITY FOR A COMBINATION SEED CLEANING AND FEED MANUFACTURING PLANT AT CULBERTSON, MONTANA.
Feed manufacturing and marketing costs survey rept.
Aug 64, 59p
Supported in part by Dept. of Commerce, Washington, D. C. Area Redevelopment Admin.

Descriptors: (*Economics, Montana), (*Food, Mammals), (*Industrial plants, Montana), Feasibility studies, Bovines, Swine, Cereals, Processing, Agriculture, Costs, Seeds, Cleaning, Site selection, Employment.

Identifiers: Area redevelopment.

The purpose of this study was to determine if a feed manufacturing and seed cleaning plant located at Culbertson, Montana would be economically feasible. The results of this study indicate a good potential for successful operation of the proposed feed manufacturing plant. However, the survey indicates it is premature to build the seed cleaning portion of the plant. Barley prices in Northeast Montana average $2.52/ton less than the state average and $7.14/ton less than in Billings, Montana. Safflower meal is available from the oil seed crushing plant located in Culbertson. The availability of these ingredients for manufactured feeds at Culbertson prices indicate a comparative advantage throughout Western North Dakota, Eastern Montana, Northwestern South Dakota, and Northern Wyoming. Considering necessary capital investment to build and operate the proposed plant, the returns over and above the total fixed and variable costs including 6 percent interest on the investment indicates the establishment of a feed processing plant at Culbertson, Montana has a good potential for economic operation based on projected marketing volumes. (Author)

PB-169 780 **Field 5C, 8F, 11L**
CFSTI Prices: HC$2.00 MF$0.50
Management Science Atlanta, Inc., Ga.
AN IDENTIFICATION SURVEY OF INDUSTRIAL OPPORTUNITIES IN AMERICUS AND SUMTER COUNTY, GEORGIA,
by Thomas L. Newberry. 13 Mar 64, 39p

Descriptors: (*Economics, Georgia), (*Industries, Georgia), (*Wood, Industries), Plywood, Labor, Natural resources, Containers, Commerce, Employment, Laminates, Transportation, Forestry, Packing materials, Handling.

Identifiers: Area redevelopment, Furniture.

The purpose of this Identification Survey is to recommend a specific industry that is most likely to accomplish the aim of the Area Redevelopment Administration in the Americus and Sumter County area. Consideration was given to over twenty different product groups, each of which appears feasible for the Americus area. These potential product groups included frozen vegetables, meat packing, mobile homes, garment, tufted carpet, pressed sheet steel products, plastic pipe, garden and lawn tools, household waxes and polishes, wood household furniture, wood particle board, wooden pallets, laminated wood beams, and Southern pine plywood. Three product groups were selected for additional consideration: Southern pine plywood, wood household furniture, and wooden pallets. Each of these three product groups appears to have a good opportunity for success if a plant is located in the Americus area. Southern pine plywood was selected as the one best candidate product for the Americus area. Some of the relevant factors which influenced this selection are as follows: over 150 unskilled workers are required, the anticipated return on investment is twenty per cent per year, and there is a large market in the Southeast for softwood plywood. While the establishment of a Southern pine plywood plant in Americus appears to present the best opportunity, there are many points that remain unanswered which should be clarified in the Feasibility Survey.

PB-169 781 **Field 5C, 2F, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Greenacres, Inc., Seattle, Wash.
FOREST INVENTORY, PICURIS PUEBLO FOREST LANDS, NEW MEXICO.
Rept. for 29 Jun 64-29 Apr 65.
26 Feb 65, 78p
Contract Cc-6173

Descriptors: (*Economics, New Mexico), (*Forestry, New Mexico), Data, Natural resources, Wood, Trees.

Identifiers: Area redevelopment.

The objective of this project is to provide the Bureau of Indian Affairs with reliable basic data on the forest resource. With this data, forest management objectives can be formulated and a basis for wise use of the forest resource is available. The feasibility of a use facility such as a sawmill can be established. The social and economic benefits of this project can be substantial, and it is hoped they will be. The project involves the various activities necessary to determine the quantity and condition of the timber resource including timber stand typing, mapping, and forest inventory.

PB-169 782 **Field 5C, 11L, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Washington State Univ., Pullman.
STUDIES OF WHOLE WOOD AND MIXED SPECIES FOR PARTICLEBOARD--FERRY COUNTY, WASHINGTON.
Final rept.,
by M. Carroll and G. G. Marra. May 63, 50p
Research rept. no. 63-15-47
Contracts Cc-5981, 10E-3815-0516,
Proj. RP-516

Descriptors: (*Economics, Washington), (*Composition board, Manufacturing methods), (*Industries, Wood), Particle size, Material forming, Compatibility, Particles, Physical properties, Industrial production, Commerce, Manufacturing methods.

Identifiers: Area redevelopment.

The objective of this study was to determine if the whole-wood sawmill residue available in Ferry County, Washington, would be adaptable to the manufacture of a particleboard of the type now made in other areas from green Douglas fir planer shavings. The work was concerned with finding a simple means of reducing the whole wood to a suitable board-making furnish, and also with the compatibility of the major species--Douglas fir, larch, spruce, and ponderosa pine. A chipping and hammermilling technique was used as the simplest means of reducing whole wood to a particle form. The work showed that a acceptable balance of strength properties could be obtained in the board if the hammermilled particle furnish were 'enriched' through the addition of knife-cut flakes. It is concluded that the simplicity of the hammermilling technique for reducing whole wood to a board-making furnish is offset by the deficiency of the particle geometry produced by this technique. This suggests that a Pallmann flaker mill is worthy of investigation as a reasonably simple means of reducing the wood chips to a more suitable particle. It is further concluded that the mixture of fir and larch in the wood supply would not give rise to any major processing problems.

PB-169 783 **Field 5C, 8F, 2B**
CFSTI Prices: HC$6.00 MF$1.25
Agri Research Inc., Manhattan, Kans.
AGRICULTURAL AND INDUSTRIAL POTENTIAL OF THE COLORADO RIVER INDIAN RESERVATION.
Jul 63, 255p
Contract 14-20-0650-1060
Availability: Original document in color until exhausted. Prepared in cooperation with Bureau of Indian Affairs, Washington, D. C.

Descriptors: (*Economics, Arizona), (*Agriculture, Arizona), (*Industries, Arizona), California, Bovines, Rivers, Soils, Natural resources, Meteorology, Transportation, Commerce, Employment, Recreation, Labor, Costs, Milk, Cereals, Food, Forestry, Vegetables, Fruits.

Identifiers: Area redevelopment, Alfalfa.

ContentsPart I, General considerations: The present state of development of the Colorado River Reservation; Resources of the Town of Parker; Markets and potential markets; Development of the agricultural potential of the Reserva tion; Industrial development potential; Problems of meeting industrial requirements. Part II, Enterprise feasibility analysis: Alfalfa dehydrating; Dairy Farming; Production of wholesale Nursery Stock; Commercial production of Vegetables, Melons, and Fruit; Cattle Feeding Possibilities; Feed manufacturing.

PB-169 784 **Field 5C, 6H, 8F, 2B**
CFSTI Prices: HC$3.00 MF$0.75
Economic Research Service, Washington, D. C.
THE ECONOMIC FEASIBILITY OF ESTABLISHING A VEGETABLE PROCESSING PLANT IN JACKSON COUNTY, FLORIDA.
Special rept.,
by F. W. Williams. Aug 63, 61p
Prepared in cooperation with Georgia Agricultural Experiment Station, Experiment and Department of Commerce, Washington, D. C. Economic Research Service.

Descriptors: (*Economics, Florida), (*Vegetables, Processing), (*Industrial plants, Florida), Agriculture, Freezing, Costs, Feasibility studies, Commerce.

Identifiers: Area redevelopment.

The minimum economically feasible size of operations appear to be a freezing plant with a capacity of about 9.5 million pounds annually, or a canning plant capable of producing an annual pack of about 585,000 cases of 24 number 303 equivalent cans. The products suggested for the freezing plant are Southern peas, lima beans, speckled butterbeans, turnip greens, kale, mustard, spinach, and collards. The same line of products is suggested for canning with the exception of speckled butterbeans. The rate of output for a freezing plant is envisioned as

5,000 pounds per hour and for a canning plant, 300 cases per hour, 24 number 303 can equivalent. The initial capital investment required for buildings and equipment will be approximately $860,000 for a freezing plant and $350,000 for a canning plant, excluding land. Total annual operating capital requirements will be about $1,200,000 for freezing and $1,270,000 for canning. A comparison of the profit and profit ratios suggests the preference of freezing over canning. But these alone do not reflect a complete comparison between the two alternative processing ventures. The requirement for initial investment capital is much greater for freezing, but seasonal capital requirements are greater for canning. The availability and cost of capital for initial investment versus the availability and cost of operating capital will influence the choice between canning and freezing.

PB-169 785 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Economic Associates, Inc., Washington, D. C.
COMMUNITY EXPERIENCES IN ECONOMIC PLANNING AND DEVELOPMENT.
Oct 62, 164p

Descriptors: (*Economics, Urban planning), (*Employment, Industries), (*Industries, Employment), New York, Textile industry, Pennsylvania, Maryland, Labor, New Jersey, Population, Industries, Wages, Urban area, Management planning, Commerce.

Identifiers: Area redevelopment.

This study of community efforts in economic planning and area redevelopment is based on case histories of eight Middle Atlantic communities which have been compelled to cope with serious problems of economic readjustment. Most of the eight areas covered in the report had suffered heavy losses in industrial employment, due chiefly to textile mill closings and cutbacks over the past decade and a half. Community action programs, organized initially to combat the loss of some 30,000 textile jobs in the affected areas, were broadened in most of these areas to embrace plans for attracting new industries, in some cases creating new economic activities, and diversifying the local economy. Efforts made by each community are examined in relation to the economic structure of the area, with major emphasis on how local programs were organized and carried out. Certain highlights from the case histories may have useful applications in other redevelopment areas. The experience of individual communities is summarized.

PB-169 788 **Field 5C, 5F, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Alaska Univ., College.
ALASKA NATIVE ARTS AND CRAFTS POTENTIAL FOR EXPANSION.
Final rept.
Jul 64, 167p
Contract 14-20-06050-1053

Descriptors: (*Economics, Alaska), (*Culture, Economics), Population, Rehabilitation, Employment, Training, Production, Commerce, Distribution (Economics).

Identifiers: Arts and crafts, Area redevelopment, eskimos, Indians.

A study was made to determine improved methods and changes needed to increase and expand the market for Alaska native arts and crafts. The sale of such items which has long played a part in the basic economy of the native people of Alaska, has suffered increasingly from loss of sales, decline in income realized by individual craftsmen and craftswomen, and general public indifference. To seek a diagnosis of the cause and possible means of correcting this situation and expanding markets, an investigation was conducted and recommendations made. The basic problem of declining markets was related to product and production, with marketing practices and lack of promotion being secondary factors. Several different types of markets were identified and their requirements determined. The project was directed toward product and production factors and the terms of the contract authorized the investigation, testing and evaluation of reviving traditional woodcarving arts and crafts in southeast Alaska and their development into contempory crafts production, and the revival and expansion of creative arts and crafts in northwest Alaska through adaptation of contemporary handicrafts to commercial production, value of local workshop training, and the selective training of promising artists and craftsmen at the University.

PB-169 789 **Field 5C, 5F, 5I, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
A STUDY OF THE TALENTS, WORK POTENTIAL AND ASPIRATIONS OF THE PYRAMID LAKE INDIANS,
by William Gomberg and Joy Leland. 1962, 123p
Rept. on proj. 'We Need To Be Shown'.

Descriptors: (*Economics, Nevada), (*Supervisory personnel, Employment), Psychometrics, Training, Aptitude tests, Anthropology, Sociology, Population, Statistical data, Job analysis, Education, Motivation, Agriculture, Recreation.

Identifiers: Area redevelopment, Indians, Indian reservations.

The resources of the Pyramid Lake Indian Reservation in Washoe County, Nevada, were studied to evaluate their potential for development, primarily agricultural and recreational. A concurrent study of the Indians' potential as managers and entrepreneurs was also undertaken. The research indicates that a substantial number of Pyramid Lake Indians think they are interested in some managerial occupations. A large proportion of these have the aptitude for high-level work, according to the tests employed. By creating job opportunities, unemployment and employment at levels below potential will be combatted if the job opportunities are tailored to fit the interests and aptitudes of the employable Indians. Sympathetic encouragement and competent guidance and supervision will enable the people to avail themselves of these created job opportunities. If Indians are afforded the opportunity to work at the highest level of which they are capable, it should be of no concern that this level may not be management. The goal should be to give every Indian the chance to live in self-respect and fully employ his personal resources.

PB-169 790 **Field 5C, 13B, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Clark, Dietz, Painter and Associates, Memphis, Tenn.
REPORT ON FEASIBILITY OF REND LAKE INTERCITY WATER SYSTEM.
Dec 63, 112p
Contract Cc-6000
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. and Rend Lake Conservancy District, Benton, Ill.

Descriptors: (*Water supplies, Economics), (*Economics, Illinois), Lakes, Feasibility studies, Costs, Population, Distribution, Purification, Urban planning.

Identifiers: Area redevelopment.

The proposed Intercity Water System is essential to realize the full potential of the economic impact the Rend Lake project can have on this area. One major justification for the existence of the multi-use of Rend Lake is as a water source, and without such a centralized water system, this particular purpose cannot be fulfilled. Studies have been made concerning various methods by which cities in the area can be served by an Intercity Water System considering both the immediate need and long term needs. Studies were made on use of existing plants in certain cities, sale of raw water to certain cities, and use of temporary facilities for such service. It has been demonstrated that it is economically feasible to construct temporary impoundment or storage facilities and service the entire area under study from a single plant. The use of the water treatment plants of individual cities as a part of the permanent system is not essential to provide a feasible operating system. It is recommended that some agreement be made with the three or four larger cities for the use of their facilities in case unusual drought or water demands occur during the period before Rend Lake actually is completed and filled with water. These agreements would assure the Intercity System of the ability to handle the water demands during extreme drought or increased water demands associated with population and industrial growth beyond expectation. (Author)

PB-169 791 **Field 5C, 11B, 8F**
CFSTI Prices: HC$6.00 MF$1.25
Aase (George) and Associates, Inc., Tallahassee, Fla.
FEASIBILITY STUDY OF A PROPOSED PORTLAND CEMENT INDUSTRY IN REDEVELOPMENT AREA A, WEST FLORIDA.
Nov 62, 220p
Contract Cc-5836
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Florida), (*Cements, Industrial plants), (*Industries, Florida), Feasibility studies, Costs, Natural resources, Commerce, Limestone, Industrial production, Clay minerals, Sand, Site selection, Natural resources, Commerce, Transportation, Labor, Employment.

Identifiers: Area redevelopment.

All raw materials needed for cement manufacture can be obtained, delivered at any of several possible plant sites in Area A, at prices which will permit economical and competitive production of cement. Reserves of raw materials are sufficient to sustain a cement plant of the capacity considered in this report throughout the operating life of the plant. Generally within a 200 mile radius of the proposed plant site, there exists a steady and moderately increasing cement market of approximately 2,470,000 barrels per year. Largely because of freight advantages due to shorter transportation distances, the proposed Area A plant could expect to command a share of this local market amounting to approximately 940,000 barrels per year. A plant operating at a minimum capacity of 1,213,000 barrels per year would be necessary to enable a low enough unit production cost to be competitive with existing sources of cement supply in the area.

PB-169 792 **Field 5C, 8F, 13J**
CFSTI Prices: HC$7.95 MF$2.25
Booz, Allen and Hamilton, Inc., Chicago, Ill.
THE PORT OF DETROIT.
29 May 63, 461p
Contract Cc-5972
Report on Economic survey and master plan for port development. Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Michigan), (*Harbors, Michigan), (*Shipping (Marine), Michigan), Shipping (Marine), Water traffic, Handing, Piers, Cargo, Commerce, Industries, Employment, Transportation.

Identifiers: Area redevelopment.

The report is divided into five major sections. The first section deals with the present and probable future volume of overseas cargo and the facilities required for handling it at the for-hire terminals. This cargo represents about 3% of Detroit's total waterborne commerce. The second section deals with the domestic and Canadian cargo handled

of total waterborne commerce through the port. The third section deals with the handling of domestic and Canadian cargo which flows over owner-used private docks. This cargo, which is largely bulk, accounts for the other 95% of waterborne commerce through the port, which in 1961 totaled 25 million tons. The fourth section discusses opportunities for development of water-oriented industries within the limits of the Wayne County waterfront. The fifth section deals with administrative and promotional factors related to the growth of the port.

PB-169 793 **Field 5C, 8F, 5A**
CFSTI Prices: HC$2.00 MF$0.50
Industrial Planning Associates, San Francisco, Calif.
A PRIMER ON COMMUNITY DEVELOPMENT.
1961, 35p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Geography), (*Employment, Geography), (*Industries, Economics), (*Instruction manuals, Urban planning), Industries, Commerce, Management planning, Natural resources, Labor, Agriculture, Railroads, Textile industry, Wood, Forestry, Mining engineering, Transportation.

Identifiers: Area redevelopment.

The Area Redevelopment Act of 1961 represents the Nation's first direct attack on the problem of chronic area unemployment and underemployment. In creating the Area Redevelopment Administration, the Congress has placed Federal support behind local communities that are trying to revive their stagnant or declining economies and provide new jobs. Communities of all sizes have been seeking new employment through industrial development for several decades -- often, however, without the overall economic and physical development of the area in view. The ARA program -- specifically geared to the needs of areas with high unemployment -- encourages a farsighted approach to redevelopment that considers the direction of economic growth both today and in the future. ARA also believes and emphasizes that the local redevelopment effort is best planned and carried out by a committee representing the ideas and experience of all major community groups. To be effective, area redevelopment requires adaptation of old methods and much thinking on new concepts and techniques. As an aid to local groups, this Primer presents some of the principles of community redevelopment. The contents of the Primer include: The need for community redevelopment. What is redevelopment. How redevelopment works. Where to get help. The long road ahead.

PB-169 794 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Program Research, New York.
MAGIC MOUNTAIN RESORT PROJECT, HAZARD, KENTUCKY.
Sep 64, 83p
Contract Cc-6147
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Kentucky), (*Recreation, Economics), Mountains, Traffic, Employment, Commerce, Population, Costs, Feasibility studies, Roads, Distribution (Economics).

Identifiers: Area redevelopment.

Economic justification for the proposed project depends upon the ability to attract a large number of day visitors in addition to overnight visitors. Recreation facilities are needed which will make this possible. The basic market is a highly seasonal one. The development of special markets as season extenders is a necessity. Participation sports should be stressed. Changes in physical layout are required to permit the handling of a large volume of visitors without congestion. Taking into consideration the many changes and modifications suggested in the report, the project appears to be economically feasible and also worthwhile from the standpoint of the community. As originally proposed, the project is highly marginal. Projected total employment of 524 is based upon the assumption that the craft center will be developed as a major new business project and that products will be created for national distribution. If not, employment opportunities for approximately 359 people can be anticipated.

PB-169 796 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Surveys and Research Corp., Washington, D. C.
ASSESSMENT OF THE IMPACT OF A SHIRT PLANT ON A TWO-COUNTY AREA IN ARKANSAS,
1962, 38p
Prepared in cooperation with the Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Arkansas), (*Industrial plants, Clothing), (*Textile industry, Arkansas), Employment, Industries, Population, Labor, Wages.

Identifiers: Area redevelopment.

An assessment was made of the impact of the Mar-Bax Shirt Company (located in Gassville, Arkansas) on the economies of Baxter and Marion counties. The report is divided into two parts: Part I establishes and analyses the basic economic indicators of the two counties: and Part II discusses the overall impact of the Mar-Bax plant on the area.

PB-169 797 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Colorado Univ., Boulder.
TOURIST DESTINATION AREA.
1961, 65p
Proj. 9
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Recreation), (*Recreation, Economics), Population, Geography, Commerce, Forestry, Lakes, Oceans, Mountains, Deserts, Management planning.

Identifiers: Area redevelopment.

In the preceding chapters an organized review of the characteristics that have led to successful developments in the twenty-four selected destination areas has been presented. Five major characteristics have been identified as essential for success. Without these optimum success is not possible. These five basic characteristics are as follows: (1) The area must have both a product that can be sold to the visitors or potential visitors. (2) The area must have a market or trade area from which visitors can be attracted. (3) The area must have a program designed to develop or adapt the product to both satisfy the desires and needs of the visitors and accomplish the program's objective. (4) The area must have a program designed to develop the market or sell potential visitors on visiting the area. (5) The area must have an evaluation program to measure accomplishments and provide information for planning a future program. These are essential for optimum success. Although the study of these twenty-four destination areas reveals that these five basic characteristics are not always present, the omission of one or more of them undoubtedly means less than maximum success.

PB-169 798 **Field 5C, 8G, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Bartlesville, Okla.
INTERIM ECONOMIC AND TECHNOLOGIC STUDY OF SILICA SAND DEPOSIT IN CHEROKEE COUNTY, TEXAS.
1962, 40p
Prepared in cooperation with the Area Redevelopment Administrration, Washington, D. C.

Descriptors: (*Economics, Texas), (*Sand, Industrial production), Silicon compounds, Dioxides, Mining engineering, Natural resources, Processing, Economic geology, Commerce, Distribution (Economics), Costs, Employment.

Identifiers: Area redevelopment.

A study was made of facilities for producing, processing, and shipping silica sands. It is concluded that if the quality of the sand produced is suitable for manufacture of glass there is a substantial market for the sand. Expansion to produce silica flour and installation of packaging and warehousing facilities would permit entering markets which a bulk plant oreration cannot do.

PB-169 799 **Field 5C, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Armour Research Foundation, Chicago, Ill.
A SURVEY OF THE RECREATION AND TOURISM RESOURCES IN THE NEZ PERCE COUNTRY, VOL I. THE SURVEY REPORT.
Final rept.,
by Joseph H. Fraser, 14 Jun 63, 139p
Contract 14-20-0650-1067,
Proj. ARF-P-025, 49-ARA-TA
Prepared in cooperation with Bureau of Indian Affairs, Portland, Oreg.

Descriptors: (*Economics, Idaho), (*Recreation, Economics), Employment, Commerce, History, Culture, Feasibility studies, Costs, Training, Population, Natural resources, Wages, Traffic, Site selection, Oregon, Washington (state), Montana.

Identifiers: Area redevelopment.

The objective of the study was to determine the feasibility of a tourist and recreational development on the Nez Perce Indian Reservation. This involves: (1) Consideration of short-range and long-range tourism-recreation development possibilities; (2) Specific recommendations for the types and kinds of tourist-recreation facilities and developments with the greatest potential in terms of investment and employment, including the best general location of each type of facility, optimum economic size based on highway traffic patterns and travel habits; (3) A recommended program of historical and cultural facilities to complement tourist facilities; (4) A financial feasibility evaluation giving costs, returns, and employment opportunities: and (5) Needs and recommendation for a vocational training program. The report is presented in two volumes. Volume I--The Survey Report--contains the Introduction, summarizes study findings and conclusions, presents detailed summaries of feasibility analyses and a plan for implementation of the recommendations. Volume II of this report, 'The Nez Perce Country' deals with the historical aspects of this study, and was prepared and submitted as a self-contained document in order to place the historical significance of this country in proper perspective with the feasibility studies of commercial ventures contained in this volume of the report.

PB-169 906 **Field 5H, 17B, 5B, 5D**
CFSTI Prices: HC$5.00 MF$1.00
Systems Science Corp., Bloomington, Ind.
A REGIONAL LAW ENFORCEMENT SYSTEMS DESIGN,
1 Feb 66, 191p
Supported by grant from the Urban Renewal Administration of the Housing and Home Finance Agency.

Descriptors: (*Police, District of Columbia), (*Command ; control systems, Police), (*Criminology, Data processing systems), (*Urban planning, Police), (*Law, Data processing systems), Cost effectiveness, Digital computers, Information retrieval, Communi cation sys-

tems, Urban area, Operations research, Systems engineering, Man-machine systems.

Identifiers: National Capital Region, Washington Metropolitan Area.

The study is directed specifically toward an assessment of the feasibility of using a digital computer as a means of improving the efficiency of the Metropolitan Law Enforcement System. The law enforcement system proposed will provide law enforcement agencies within the metropolitan Washington, D. C. area capability for five specific functions. These functions are: (1) Automatic message switching between jurisdictions in the area; (2) information storage and retrieval; (3) system for the collection of information as it occurs and its dissemination on request to responsible commanders in the law enforcement agencies; (4) resource allocation; and (5) command and control systems.

PB-169 965 **Field 5C, 13J, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Stanford Research Inst., Menlo Park, Calif.
ECONOMIC ANALYSES OF ST. LAWRENCE SEAWAY CARGO MOVEMENTS AND FORECASTS OF FUTURE CARGO TONNAGE,
by Neil T. Houston. Nov 65. 170p
Contract C-194-65,
Proj. SRI-1-5388

Descriptors: (*Economics, Shipping (Marine)), (*Shipping (Marine), Inland waterways), (*Inland waterways, Cargo), New York, Ontario, Water traffic, Weight, Commerce, Mathematical prediction, Statistical analysis, Transportation, Costs, Ores (Metal sources), Iron, Coal, Petroleum, Cereals.

Identifiers: St. Lawrence seaway.

For analysis, total Seaway cargo tonnage was divided into the following major commodity components: iron ore, grains, coal and coke, petroleum and petroleum products, general cargo, and minor bulk commodities. Factors determining the movement of each of these traffic components were studied and high and low estimates of future cargo tonnage were projected. Based on these estimates, the projection of total cargo movements through the Seaway is presented for 1965, 1970, 1975, 1980 and 2000. Iron ore and grains are expected to continue to be the largest components of cargo movements, each comprising about one-third of the total. The estimates were found, in general, not to be easily influenced by moderate changes in tolls. However, increased tolls could cause the loss of current movement of about one million tons of iron ore and might affect long-run investment decisions in Labrador-Quebec iron ore sources. Increased tolls might also cause the loss of marginal grain shipments. A six-week lengthening of the Seaway and Great Lakes navigation season could be expected to result in increased tonnage for two traffic components. General cargo tonnage would probably increase 10 to 15 percent with an extension of either or both ends of the season. Annual grain traffic would probably be increased more than proportionately by a later winter closing of the shipping season. (Author)

PB-170 000 **Field 5C, 8F, 5D, 5K**
CFSTI Prices: HC$5.00 MF$1.00
Armour Research Foundation, Chicago, Ill.
A SURVEY OF THE RECREATIONAL AND TOURISM RESOURCES IN THE NEZ PERCE COUNTRY. VOLUME II. THE NEZ PERCE COUNTRY.
Final rept.,
by Erwin N. Thompson. Sep 63. 158p ARF-9-025
Prepared in cooperation with Bureau of Indian Affairs, Washington, D. C.

Descriptors: (*Economics, Idaho), (*Recreation, Economics), (*Culture, Idaho), (*History, Idaho), Oregon, Washington (State), Montana, Employment, Commerce, Site selection, Natural resources, Feasibility studies.

The objective of the study was to determine the feasibility of a tourist and recreational development on the Nez Perce Indian Reservation. This involves: (1) Consideration of short-range and long-range tourism-recreation development possibilities; (2) Specific recommendations for the types and kinds of tourist-recreation facilities and developments with the greatest potential in terms of investment and employment, including the best general location of each type of facility, optimum economic size based on highway traffic patterns and travel habits; (3) A recommended program of historical and cultural facilities to complement tourist facilities; (4) A financial feasibility evaluation giving costs, returns, and employment opportunities; and (5) Needs and recommendation for a vocational training program. The report is presented in two volumes. Volume I--The Survey Report--contains the Introduction, summarizes study findings and conclusions, presents detailed summaries of feasibility analyses and a plan for implementation of the recommendations. Volume II of this report, 'The Nez Perce Country' deals with the historical aspects of this study, and was prepared and submitted as a self-contained document in order to place the historical significance of this country in proper perspective with the feasibility studies of commercial ventures contained in the first volume of the report.

PB-170 001 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Program Research, New York.
FLOODRAMA AND INCLINED PLANE PROJECT, JOHNSTOWN, PENNSYLVANIA,
by Virginia Keyser. Dec 63. 110p
Contract Cc-6096,
Proj. 594

Descriptors: (*Economics, Pennsylvania), (*Recreation, Economics), Industries, Commerce, Employment, Costs, Buildings, Roads, Traffic, Floods, Museums, History, Feasibility studies.

Identifiers: Area redevelopment, Tourist industry.

The study has included becoming familiar with the plans for development of Johnstown, Cambria County, and neighboring areas; collecting, reviewing, and analyzing data relating to the characteristics of the local and tourist populations which are expected to provide customers for the proposed facilities; collecting information concerning other facilities for comparison with this project; making a site investigation; and on the basis of the data collected, analyses performed and knowledgeable judgment, making estimates of the use and revenue which can be generated if the project is carried forward. Also the study has included the development of suggestions for the physical layout and design for the animated showing of the flood events. (Author)

PB-170 002 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Little (Arthur D.), Inc., Cambridge, Mass.
ECONOMIC IMPACT OF PROPOSED DELAWARE BAY CROSSINGS ON THE SOUTH JERSEY ECONOMY.
22 Nov 63. 117p Rept. no. C-65531
Contract Cc-6006,
Proj. 483

Descriptors: (*Economics, New Jersey), (*Transporta tion, New Jersey), Delaware, Delaware bay, Bridges, Traffic, Commerce, Employment, Recreation, Boats.

Identifiers: Area redevelopment.

The report sets forth the findings of an economic impact study of two proposed crossings of Delaware Bay: a ferry line operating between Cape May, New Jersey, and Lewes, Delaware; and a bridge connecting Sea Breeze, New Jersey, and Bombay Hook, Delaware. Focusing entirely upon the New Jersey side, the study includes a delimitation of the respective impact areas of the proposed crossings, an examination of economic changes in the region thus delineated, and an analysis of present and projected traffic flows as a basis for determining additional employment likely to be created by connecting South Jersey with the Delaware Shore south of the existing Delaware Memorial Bridge.

PB-170 003 **Field 5C, 11L, 8F**
CFSTI Prices: HC$7.00 MF$1.50
Macdonald Associates, Inc., Washington, D. C.
A WOOD CONVERSION INDUSTRY COMPLEX FOR SUPERIOR-DOUGLAS COUNTY, WISCONSIN.
24 Jul 64. 339p
Contract Cc-6089,
Proj. 2

Descriptors: (*Economics, Wisconsin), (*Wood, Processing), (*Industries, Wood), Transportation, Feasibility studies, Commerce, Industrial plants, Plywood, Composition board, Preservation, Site selection, Transportation, Employment, Trees, Forestry, Natural resources, Labor.

Identifiers: Area redevelopment.

The wood processing and marketing complex recommended is a multiple corporate organization comprising a principal corporation, a subsidiary wood raw material procurement corporation, and a subsidiary marketing corporation. Several independent but affiliated processing plants are also recommended. The product lines to be manufactured by the processing activities of the entire complex will permit the most efficient use of the forest resource according to the form and quality in which it occurs. The principal corporation will operate the raw material collection, preparation, and storage yard for the complex. Its manufacturing activities will include a flakeboard plant, a hardwood plywood plant, and the production of chips for sale to the pulp industry. At full capacity, 263 cords of cordwood and 21.8 thousand board feet of sawtimber will be processed each day. The independently owned wood processing plants, being an integral part of the complex, will purchase their raw material from a small sawmill operated by the principal corporation that will cut 20,000 board feet of lumber per day. They will be able to manufacture laminated solid wood corestock, prefabricated wood parts, animal litter, mulch, charcoal briquettes, and preservatively treated wood products. These operations will rely upon the principal corporation to satisfy their raw material needs; and they will market their products through the sales corporation of the complex.

PB-170 004 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
PRELIMINARY FINDINGS AND RECOMMENDATIONS: AREA REDEVELOPMENT IN ANACONDA, MONTANA.
by Kenneth C. Wagner. 19 Feb 63. 9p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Montana), (*Industries, Montana), Refining (Metallurgy), Natural resources, Labor, Power supplies, Water supplies, Site selection, Mining engineering, Wood, Wood pulp, Electronics, Commerce, Industrial relations, Wages, Population, Climatology, Paper.

Identifiers: Area redevelopment, Tourist industry.

Recommendations: (1) Basic resource data must be compiled so that accurate information can be supplied to any firms which evidence interest in the area. (2) An industrial site study should be made and one or more parcels of land optioned

or purchased to profide an attractive site for prospective new industry. (3) Tourist industry potentials should be surveyed. (4) The possibility that skilled workers who may otherwise be thrown out of jobs might take over and operate the old foundry in Anaconda when it is closed down by The Company should be carefully studied. (5) 'Satellite' industry possibilities should be explored, particularly potentials for producing locally items which may now be shipped in in sizeable quantities by the major companies in the area. (6) 'Home-grown' industry possibilities should be studied, particularly those related to the existing mining complex, wood products, and the tourist industry. (7) Large power using industries should be screened to determine which might find the availability of low cost Bonneville power a sufficient advantage to offset possible disadvantages such as shipping distances and costs. (8) High value added products should be screened to determine whether certain electronics or other such items might be profitably produced in the area despite its distance from major markets.

PB-170 005 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Community Planning Services, Inc., Monroeville, Pa.
PROPOSED OTOCSIN RECREATION AREA IN CLEARFIELD COUNTY.
1965, 24p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Pennsylvania), (*Recreation, Economics), Employment, Industries, Roads, Traffic, Lakes, Mountains, Buildings, Natural resources, Geography.

Identifiers: Area redevelopment, Recreation facilities.

There are numerous facilities proposed at Otocsin which are ideally designed for development by private capital such as the Motels, Resort Lodge, Honeymoon Retreat, Children's Zoo, Fantasy Forest, Narrow Gauge Railroad, Rural Shopping Center, Marina, and perhaps the Ski Lodge and Slopes. The unique location and planning of Otocsin present businessmen and investors with a captive market. A reasonable estimated capacity of Otocsin for only those facilities as shown on the present plans would be approximately 150,000 people per day. A reasonable average daily attendance during a summer day in 1970 will be an estimated 50,000 people. Assuming that each person would spend an average of only $4.00 each day, the resulting expenditure would be $200,000 per day for four months of the year. During the remainder of the year it is reasonable to expect an average $25,000 expenditure per day or a total gross annual expenditure of $30,000,000. The broad concept of Otocsin fulfills an ever-increasing recreational need, creates new jobs, provides an opportunity for successful investments and helps to establish attractive environment for new industry.

PB-170 006 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Brown and Root, Inc., Houston, Tex.
MARKET STUDY FOR TOURIST AND RECREATIONAL FACILITIES FOR THE ALABAMA-COUSHATTA INDIAN RESERVATION, POLK COUNTY, TEXAS,
by William O. Parker. 22 Jun 64, 42p
Contract Cc-6151
Availability: Original document in color until exhausted.

Descriptors: (*Economics, Texas), (*Recreation, Economics), (*Industries, Recreation), Employment, Commerce, History, Culture, Geography, Traffic, Population, Natural resources, Lakes, Forestry, Roads, Feasibility studies.

Identifiers: Indian reservation, Area redevelopment, Indians, Tourist industry, Recreational facilities.

In an effort to raise the standard of living of the Indians and to make the Reservation self-supporting, it is proposed that a tourist and recreational facility be developed on the Indian Reservation. It is believed that such a development will accomplish several things: (1) It will attract tourists and tourist dollars to the Reservation. (2) It will create jobs for the inhabitants of the Reservation, since all operation and administration of the facility would be by the Indians themselves. (3) The additional tourist attraction would aid the economy of the surrounding area. (4) It will aid in raising the economy of the Reservation to a level of self-support, and will provide funds for capital improvements, educational opportunities and conservation or development programs on the Reservation. (5) It will provide an attraction which will tend to stimulate interest in this historic and beautiful part of East Texas. This market study has been made in order to determine whether or not a market exists, and to make some sort of estimate of the benefits that may be expected to accrue to the Reservation and to the surrounding area. It is concluded that a market does exist for the goods and services that will be available through the development of tourist and recreational facilities on the Alabama-Coushatta Indian Reservation.

PB-170 007 **Field 5C, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Booker (R. W.) and Associates, Inc., St. Louis, Mo.
LIVINGSTON LAKE DEVELOPMENT PROJECT, SAN JACINTO COUNTY, TEXAS.
3 Jun 63, 129p
Contract Cc-6009,
Proj. 376

Descriptors: (*Economics, Texas), (*Recreation, Economics), Lakes, Commerce, Industries, Sanitary engineering, Transportation, Feasibility studies, Geography, Roads, Water supplies, Power supplies, Natural resources, Agriculture, Forestry, History, Geology, Landing fields.

Identifiers: Area redevelopment, Recreastional facilities.

An overall zoning and land use control pattern around Livingston Lake should be created. A program of providing public, day use recreational facilities in the Livingston Lake area should be instituted. A program of providing overnight accommodations should be instituted. Sequential development should be encouraged starting with the most attractive projects from an economic point of view. A program of identifying, marking and beautifying historical sites and points of scenic and geologic interest in San Jacinto County should be instituted. Provision should be made for a system of roads that will provide good access to the area and will connect together the important points on the new shoreline. A turf landing strip suitable for single and twin engine aircraft up 12,500 pounds weight should also be provided. Provision should be made for adequate supply of utilities in the proposed development area. The development of industrial sites should be deferred until the recreational program is well established.

PB-170 009 **Field 5C, 8F, 11B**
CFSTI Prices: HC$1.00 MF$0.50
Kirschner Associates, Albuquerque, N. Mex.
SKENDER CERAMICS BUTTE, MONTANA.
Final rept.
30 Aug 65, 14p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Montana), (*Ceramic materials, Industries), (*Industries, Montana), Commerce, Manufacturing methods, Costs, Distribution (Economics), Clay, Labor, Wages, Packaging, Molding, Heat treatment, Management engineering.

Identifiers: Area redevelopment.

The present capabilities of the company are such that it cannot expect to penetrate beyond the local Butte and Montana markets. An increased capital base for the company will not overcome the fundamental difficulties of the company which are a lack of ability to design items of unique attractiveness and a lack of understanding of the techniques of low cost mass production. However, the company does have the capacity, both in terms of skills and facilities, to capture a share of the local market by establishing good personal relationships with the retail shops in the area and by providing excellent service. Larger organizations headquartered in other areas often have difficulty providing small retailers with outstanding service and this difficulty represents an opportunity for Skender. When Skender has established a profitable business serving retail stores in the local area, it will then be appropriate to consider an expansion requiring greater design, manufacturing and sales capabilities. (Author)

PB-170 010 **Field 5C, 8F, 5A**
CFSTI Prices: HC$5.00 MF$1.00
System Development Corp., Santa Monica, Calif.
A REPORT TO THE AREA REDEVELOPMENT ADMINISTRATION U. S. DEPARTMENT OF COMMERCE ON A MODEL FOR AN APPALACHIAN REGIONAL COMMISSION.
6 Nov 64, 172p TM-WD-138/001/00
Contract C-48-65

Descriptors: (*Economics, Geography), (*Management planning, Economics), (*Instruction manual, Management planning), Natural resources, Industries, Symposia, Research program administration, Urban planning, Agriculture, Forestry, Commerce, Mining engineering, Pennsylvania, West Virginia, Maryland, Kentucky, Tennessee, South Carolina, North Carolina, Georgia, Alabama, Ohio.

Identifiers: Area redevelopment, Appalachian region, Appalachian regional commission.

The document is divided into five chapters, followed by Appendices A through I. Chapter I is the Introduction. Chapter II, Forming and Enabling the Commission, provides sample basic instruments and procedural steps through which the Commission can emerge from its initial business meeting as an effective, ongoing organization. Chapter III is titled Functions of the Commission. This is the central portion of the document. Functions are delineated to encompass those areas in which the Commission must operate. This section also presents the rationale for the human organization which would be created by Commission actions in compliance with the suggestions in Chapter II. Chapter IV, Recommended Organization: Structure, Concepts, Staffing, and Procedures, recommends a process-oriented structure to enable the Commission to achieve its goals. Chapter V, Management Plan, consists primarily of a flow chart which presents an integrated management plan. A graphic and narrative description is given of interdependencies among the personnel, fiscal, information management, research/evaluatuion, program development, technical assistance, and project analysis functions.

PB-170 011 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Economic Associates, Inc., Washington, D. C.
PROMISING INVESTMENT OPPORTUNITIES IN SOUTH CENTRAL ALASKA.
Jan 65, 48p
Prepared in cooperation with Rock (William P.) Associates, Washington, D. C.

Descriptors: (*Economics, Alaska), (*Industries, Alaska), Commerce, Population, Employment, Construction, Harbors, Cargo, Boats, Fishes, Airports, Fertilizers, Food, Processing, Fur, Freezing, Cements, Grasses,

Wood, Electronic equipment, Mining engineering, Gold, Agriculture, Seafood.

Identifiers: Area redevelopment.

The purpose of this survey was to identify promising investment opportunities in the South Central Alaska area. Emphasis was placed on restoring the economic activities destroyed or damaged by the March 27, 1964, earthquake, as well as creating new jobs in industries which did not exist before, but which, because of favorable resources or markets, would have an opportunity to grow and thus add to local employment. Construction of freezing and cold storage plants, both shore-based and floating types, together with the development of new technologies for packaging, transportation, and marketing of salmon and other sea food products, is one of the highest priority problems that must be solved in the immediate future. Expansion of docking facilities to accommodate the expected growth of sea food processing industries is another critical need for a number of the communities surveyed. Small-boat repair yards are also needed and would contribute significantly to the stability of the fishing industry. Lumber and fur industries also appear to have considerable potential for growth in some communities. With the newly discovered natural gas in the Kenai peninsula and Cook Inlet areas, such energy-dependent activities as cement production, greenhouse gardening, and fertilizer making might take on added feasibility. Better marketing methods, and improved quality control to meet FHA specifications on the part of local lumber mills would be of considerable help in stimulating the growth of this industry.

PB-170 012 **Field 5C, 8F, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Saunders (W. B.) and Co., Washington, D. C.
TRANSPORTATION AND DISTRIBUTION FOR SELECTED INDUSTRIES IN NORTHEAST MINNESOTA AND NORTHERN WISCONSIN.
Final rept.
31 Jul 64, 82p
Contract Cc-6104

Descriptors: (*Economics, Geography), (*Transporta tion, Economics), (*Minnesota, Transportation), (*Wisconsin, Transportation), Distribution, Industries, Costs, Shipping (Marine), Traffic, Cargo, Commerce, Employment.

Identifiers: Area redevelopment.

The study shows that the economic climate and geographic disability of Minn/Wisc can be improved, and that this will accomplish redevelopment. While it is true that specific steps can be devised to improve the technology of particular industries or attract some particular new industry, the fact is that transportation and distribution systems are all-pervasive; when they are improved, they affect many industries simultaneously. Furthermore, improvement in this basic service industry automatically lowers costs for any new industry which may be considering the establishment of new facilities in the area. The general tasks which must be carried out are: to lower distribution costs for ore concentrates; to stimulate a wood chipping industry using new types of freight cars so as to lower pulp and paper costs; to develop a coordinated distribution system by consolidating the freight of many small companies; to widen the marketing horizons of local industry by showing them how to cut distribution costs and penetrate distant markets; to stimulate new enterprises to take advantage of the opportunities and demands generated by all of the foregoing; to study the possibilities for improving the competitive position of Duluth-Superior as an export grain port; to develop the data needed in order to design an optimum Lakes package freight service. (Author)

PB-170 013 **Field 5C, 11L, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Faucett (Jack) Associates, Inc., Silver Spring, Md.
POTENTIAL UTILIZATION OF TIMBER RESOURCES IN THE TRI-STATE AREA.
Feb 64, 137p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C. Subcontracted to Pittsburgh Univ., Pa.

Descriptors: (*Maryland, Economics), (*Pennsylvania, Economics), (*Wood, Economics), (*West Virginia, Economics), (*Economics, Wood), Natural resources, Wood pulp, Commerce, Industries, Employment, Forestry, Trees, Distribution (Economics), Paper.

Identifiers: Area redevelopment, Appalachian region.

The report summarizes the findings of a study of the timber resource potential in an area referred to in this study as the Tri-State Area. The area is comprised of 16 counties -- 11 in West Virginia, 3 in Maryland and 2 in Pennsylvania. The objectives of the study were: to investigate the potential increase in timber cut that could be sustained without depletion of the resource; to investigate the market potential for increased production of timber products in the area; to investigate forms of organization and methods of production and marketing aimed at improving utilization practices and increasing the net economic return from the timber resources to the people in the area; and to measure the potential impact of the increased utilization of timber resources on the local economy.

PB-170 016 **Field 5C, 11I, 8F**
CFSTI Prices: HC$4.00 MF$1.00
North Star Research and Development Inst., Minneapolis, Minn.
A STUDY OF THE FEASIBILITY OF ESTABLISHING A CHEMICAL AND PLASTICS INDUSTRY IN NORTHEASTERN MINNESOTA. SECTIONS 6-8 AND APPENDIXES.
Final rept., phase 1,
by E. E. Erickson and C. W. Rudelius. 22 Dec 64, 141p

Descriptors: (*Economics, Minnesota), (*Chemical industry, Minnesota), (*Plastic industry, Minnesota), Feasibility studies, Petroleum, Formaldehyde, Thermo setting plastics, Industrial plants, Plastics, Commerce.

Identifiers: Area redevelopment.

The petroleum available to northeastern Minnesota by pipeline is in adequate supply and at a low enough cost for the development of a petrochemical industry. The natural gas now available by pipeline to the area is probably adequate only for domestic and minor industrial consumption, and its cost would be prohibitive for use as a chemical raw material. There appears to be no market immediately available, or on the horizon, which would make the manufacture of chemical intermediates from either petroleum or natural gas economically attractive in the area. Probably the nearest thing to a market for a chemical intermediate is that for formaldehyde for the manufacture of thermosetting resins -- phenolic, urea, and melamine. Such an operation would require a source of methanol. Small package plants for the manufacture of formaldehyde from methanol are available on a turn-key basis. Even though the market for formaldehyde in the area does not warrant immediate consideration of such a plant, production of formaldehyde from purchased methanol probably offers the most attractive opportunity for production of chemical intermediates in the reasonably foreseeable future. (Author)

PB-170 017 **Field 5C, 2B, 8F, 6H**
CFSTI Prices: HC$3.00 MF$0.75
Department of Agriculture, Washington, D. C.
A STUDY OF THE DOMESTIC MARKETING SYSTEM OF AMERICAN SAMOA,
by Henry T. Badger. Dec 62, 61p

Descriptors: (*Economics, Polynesia), (*Agriculture, Polynesia), (*Commerce, Polynesia), Pacific Ocean Islands, Industries, Recreation, Employment, Distribution (Economics), Food, Costs, Passenger vehicles, Gasoline, Management engineering.

Identifiers: American Samoa.

American Samoa is in the throes of adjusting from a primitive subsistance type economy to that of the Western World. The economy of this small South Pacific Island is basically agricultural. To help bridge the gap between these extremely different economies, their agricultural economy must be revitalized and ways must be found to produce income from other sources such as industrialization and tourism. Improved marketing practices are essential to achieve these results. The purpose of this report is to provide an economic appraisal of agricultural marketing practices in American Samoa for native and imported products. The report is limited to a study of domestic marketing practices on the Island of Tutuila, including a study of retail trade and a study of the Public Market for native agricultural products. Each of these areas is discussed and recommendations for action are made. Implementation of these recommendations should not only improve marketing practices, but should provide additional employment on the farms and increase purchasing power at the retail level.

PB-170 018 **Field 5C, 8F, 8I**
CFSTI Prices: HC$2.00 MF$0.50
Midwest Applied Science Corp., Lafayette, Ind.
THE ECONOMIC DEVELOPMENT OUTLOOK FOR LAWRENCE COUNTY, INDIANA.
Working paper,
by Charles King and William Spaulding. Jun 65, 49p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Indiana), (*Limestone, Indiana), (*Industries, Limestone), Employment, Commerce, Labor, Natural resources, Transportation, Wages, Mining engineering, Labor unions, Rock (Geology), Data, Production.

Identifiers: Area redevelopment.

Specific Services to be provided were to: (1) Analyze the economic problems of Lawrence County, Indiana, and outline a program of action which might be taken; (2) Prepare a realistic report of the prospects for the dimension limestone industry which has dominated the economics of Lawrence and Monroe Counties; and (3) Identify other realistic economic development opportunities for Lawrence County. It was agreed at the outset that emphasis would be placed on an analysis of the probable contribution of the dimension limestone industry to the economic future of Lawrence County. In addition, it was understood that conclusions would be reached in the context of the present interests and capabilities of county leadership.

PB-170 021 **Field 5C, 8F, 2F, 11L**
CFSTI Prices: HC$1.00 MF$0.50
Macdonald Associates, Inc., Washington, D. C.
PILOT ANALYSIS: THE ACQUISITION OF TIMBER FOR AN INTEGRATED PLYWOOD AND WOOD PRODUCTS COMPLEX IN UPPER MICHIGAN.
17 May 65, 8p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Michigan), (*Wood, Industries), (*Forestry, Michigan), (*Industrial procurement, Wood), Trees, Plywood, Processing, Natural resources, Laminates.

Identifiers: Area redevelopment.

Conclusions: (1) There is a sufficient quantity of sawtimber available in Upper Michigan to supply the projected annual requirement of the complex

for 55 million board feet in the desired species. (2) There is not suitably stocked timberland in the Upper Peninsula of Michigan, outside of the Ford Fund timberland, available for purchase or control by the proposed complex. (3) The gross volume of wood raw material required by the proposed complex cannot be satisfied by leasing timberlands, by contract purchase of stumpage or sawtimber, or by open market purchase of sawlogs – without support through ownership of suitably stocked timberland. (4) The projected quantity of 33 million board feet of hemlock sawlogs can be procured through open market transactions without ownership or control of forest lands. (5) The projected quantity of 22 million board feet of maple (or substitute birch) sawlogs cannot be procured other than through ownership in fee of the 77,000 acre Ford Fund tract. (6) Procurement of the required volume of sawtimber can be accomplished without detrimental effect on existing sawmills provided the 77,000 acre Ford Fund timberland is owned by the company. (Author)

PB-170 022 **Field 5C, 8F, 5A**
CFSTI Prices: HC$1.00 MF$0.50
Kirschner Associates, Albuquerque, N. Mex.
PHILP'S COPPER, BUTTE, MONTANA.
Final rept.
30 Aug 65, 14p
Prepared in cooperation with Area Redevelopment Admin. Wash. D. C.

Descriptors: (*Economics, Montana), (*Commerce, Montana), (*Copper, Industries), Management engineering, Distribution (Economics), Costs.

Identifiers: Area redevelopment.

Philp's Copper is not in a position to compete successfully in the national or regional decorative gift ware market due to a lack of management, production, marketing and financial capabilities and the lack of consumer interest in copper products. An infusion of capital into the company will not solve the problems. Philp's Copper is in a position to increase its volume of business with retail stores serving the tourists in the Montana region. This can be accomplished within presently existing capabilities if well-directed effort is devoted to achieving this goal. (Author)

PB-170 024 **Field 5C, 6H, 2B, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Vitro Engineering Co., New York.
REVIEW OF FEASIBILITY SUGAR BEET REFINERY, AROOSTOOK COUNTY, MAINE.
8 Mar 65, 80p KLX-1871
Contract C-200-65-NEG
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Maine), (*Vegetables, Processing), (*Industrial plants, Maine), Feasibility studies, Site selection, Wastes (Industrial), Disposal, Food, Industries, Agriculture, Costs, Commerce.

Identifiers: Area redevelopment, Sugar beets.

The site, marketing and process recommended by the revised Lockwood Greene report are suitable for the project. Agronomy, in our opinion, can support a beet plant in the Aroostook County area of Maine, but intensive agricultural support of the farm program is required due to questions posed by the failure in 1964 to obtain a good test crop. The capital cost of the project should be budgeted at $14,700,000 unless some of the additional storage buildings will be constructed by Great Northern and rented to the project. This change in capital cost does not affect plant profits appreciably. The project is still economically sound. Two major concerns are apparent: schedule and waste disposal. We conclude that an Oct. 1966 startup is very tight. By our suggested tight schedule we believe processing might not start until December. The full plant feed of 400,000 tons of beets would then extend probably through March. This will result in less sugar extraction since beets will deteriorate badly after 120 days of storage, depending upon the weather. Waste disposal to the Prestile stream without secondary treatment after ponding seems improbable. The cost of secondary treatment is very high. Alternate measures must be investigated and a solution devised simultaneously with the start of plant design. (Author)

PB-170 027 **Field 5C, 8F**
CFSTI Prices: HC$3.00 MF$0.75
Herkenhoff (Gordon) and Associates, Albuquerque, N. Mex.
STATE OF NEW MEXICO: DEVELOPMENT PLAN OF RECREATION FACILITIES FOR CONCHAS LAKE AND UTE LAKE STATE PARKS.
May 65, 93p
Rept. on Technical Assistance Proj. Area Redevelopment admin. Wash. D. C.

Descriptors: (*Economics, New Mexico), (*Recreation, Economics), Lakes, Commerce, Natural resources, Geography, Costs, Buildings, Employment, Design, Population, Construction.

Identifiers: Area redevelopment, Recreation facilities.

Construction of all facilities enumerated in the preliminary report has been justified. Section III of this report presents the initial development program for each park. Additional facilities shown in Section IV will be constructed as required to satisfy demand. While estimated revenue production of several facilities included in the initial program fail to justify their cost directly, they are required to create a complete and balanced recreation resource. Their importance to the fiscal aspect of each park lies in the induced effect they will have on other revenue producing facilities. Based on the foregoing we recommend that action be taken to issue revenue bonds to finance construction of the initial development program as enumerated in Section III of this report. Since it will not be possible to treat Conchas Lake and Ute Lake State Parks concurrently, we recommend the initial issue be for Conchas and that the Ute project be funded as quickly as details on financing and final design can be formulated. (Author)

PB-170 029 **Field 5C, 8F**
CFSTI Prices: HC$1.00 MF$0.50
Horwath and Horwath, Kansas City, Mo.
PROPOSED RESORT MOTEL COMPLEX TABLE ROCK LAKE, MISSOURI.
Jan 64, 16p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Missouri), (*Recreation, Economics), Lakes, Costs, Roads, Commerce, Natural resources, Population, Buildings, Housing projects.

Identifiers: Recreation facilities, Area redevelopment, Motels.

Economic data has been reviewed pertaining to the Table Rock Lake, Missouri area to determine the need, if any, for a resort motel complex. It has been concluded that the site is poorly located with respect to the major metropolitan population centers in Missouri and that there is not a sufficient demand for these facilities to insure a reasonably satisfactory level of occupancy. Therefore, only a limited review of the projected income and expenses has been made. Comments pertaining to these projections are included as Part II of the attached report. The basic conclusions regarding location and demand, further study of this project as outlined in Phase II or the letter dated January 8, 1964 is not recommended.

PB-170 031 **Field 5C, 6H, 8F**
CFSTI Prices: HC$4.00 MF$0.75
Louisiana State Univ., Baton Rouge. Dept. of Agricultural Economics and Agribusiness.
FEASIBILITY OF ADDITIONAL VEGETABLE PROCESSING PLANTS IN SOUTH CENTRAL LOUISIANA,
by Leo Polopolus and Clayton Strebeck. Apr 65, 111p DAE-341
Prepared in cooperation with the Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Louisiana), (*Vegetables, Processing), Industrial plants, Feasibility studies, Site selection, Industries, Employment, Agriculture.

Identifiers: Area redevelopment.

On the basis of a comprehensive analysis of the additional raw product supplies available for processing by 1970, the excess capacity of the existing vegetable processing industry in South Central Louisiana, plant efficiency factors, the national market potential for dehydrated sweet potato flakes, canned sweet potatoes, canned okra and canned okra-tomatoes, and the economic feasibility criterion, it would be economically feasible to invest in additional vegetable processing facilities in South Central Louisiana by 1970.

PB-170 035 **Field 5C, 8I, 21D, 8F**
CFSTI Prices: HC$3.00 MF$0.50
Bureau of Mines, Seattle Wash. Coal Research Lab.
WILKESON AREA COAL STUDY (PIERCE COUNTY, WASHINGTON).
Jun 63, 53p
Proj. ARA-365
Prepared in cooperation with Zinder (H) and Associates, Seattle, Wash. for Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Washington), (*Coal, Economics), Mining engineering, Production, Costs, Commerce, Employment, Natural resources.

Identifiers: Area redevelopment.

Resumption of large-scale coal-mining operations in Pierce County, Washington, appears feasible, although not without some problems. Difficulty of mining is the most serious problem. Solution to the problem will require ingenuity and resourceful engineering. The complex geologic structure of the coal beds presents mining difficulties which must be overcome in order to achieve the increased productivity necessary for economic operations. Production on the order of 15 tons per manday would make resumption of mining appear favorable. Although a challenge, this level of productivity is deemed possible of attainment. Cleaning problems are also posed but can be solved by present coal-preparation techniques. The development of markets to absorb output at prices adequate to support economic operations, once productivity is improved, is probable. Processing mine output into coking coal for sale to Japan accompanied by stockpiling second-quality middling coal for future use as fuel in thermal-electric generating plants is the most probable of several alternative production situations. Storage of middlings presents no serious technical problem. Known coal reserves in Pierce County total 362 million tons. Additional geologic data would probably reveal substantially greater reserves. Nearly three-fourths of known reserves occur in beds exceeding 42 inches in thickness, Well over 50 percent of minable reserves is believed recoverable.

PB-170 063 **Field 5C, 5A, 8F**
CFSTI Prices: HC$4.00 MF$1.00
Drexel Inst. of Tech., Philadelphia, Pa.
AN ANALYSIS OF LITTLE BUSINESS AND THE LITTLE BUSINESSMAN IN PHILADELPHIA, VOLUME I.
30 Jun 64, 137p

Descriptors: (*Economics, Philadelphia), (*Commerce, Philadelphia), Population, Management engineering, Education, Distribution

(Economics), Costs, Money, Supervisory personnel, Management planning, Sociology, Aptitude tests, Social psychology.

Identifiers: Small business.

Economic growth in the U. S. has only been moderate during the last decade. Economic growth in the Philadelphia area has been at or slightly below the national average. Economic growth for little businesses has been below the across-the-board average rate of growth. Why has little business done so poorly. Little businesses do not succeed for a whole variety of reasons. Many times they have insufficient permanent capital and very limited availability of credit. Frequently, the entrepreneurs have little business competence. Most often, they are in businesses for which, or located in areas where, the basic economic forces are contractive. One result of our study is to emphasize the extremely large proportion of small businessmen in retail trade in spite of sharp declines in the numbers of small retail establishments. Nevertheless, the continuous increase of shopping centers, the growth of discount department stores, the magnetic attraction of supermarkets, all fostered by the automobile and the mobility of the consumer, are likely to mean further shrinkage in the population of small retailers. The neighborhood retailer is more than ever limited as to growth. Only the most efficient, the best trained and the adequately financed can hope to survive. In general, our studies indicate that the would-be businessman should look more closely at consumer services. Consumer incomes are increasing. A larger portion of their spendings are going for services. In the service industries, the little businessman is not at such a comparative disadvantage as in retailing or manufacturing.

PB-170 064 **Field 5C, 5A, 8F**
CFSTI Prices: HC$5.00 MF$1.00
Drexel Inst. of Tech., Philadelphia, Pa.
AN ANALYSIS OF LITTLE BUSINESS AND THE LITTLE BUSINESSMAN IN PHILADELPHIA, VOLUME II. APPENDIX.
30 Jun 64, 178p

Descriptors: (*Economics, Philadelphia), (*Commerce, Philadelphia), Population, Management engineering, Education, Distribution (Economics), Costs, Money, Supervisory personnel, Management planning.

Identifiers: Small business.

Economic growth in the U. S. has only been moderate during the last decade. Economic growth in the Philadelphia area has been at or slightly below the national average. Economic growth for little businesses has been below the across-the-board average rate of growth. Why has little business done so poorly. Little businesses do not succeed for a whole variety of reasons. Many times they have insufficient permanent capital and very limited availability of credit. Frequently, the entrepreneurs have little business competence. Most often, they are in businesses for which, or located in areas where, the basic economic forces are contractive. One result of our study is to emphasize the extremely large proportion of small businessmen in retail trade in spite of sharp declines in the numbers of small retail establishments. Nevertheless, the continuous increase of shopping centers, the growth of discount department stores, the magnetic attraction of supermarkets, all fostered by the automobile and the mobility of the consumer, are likely to mean further shrinkage in the population of small retailers. The neighborhood retailer is more than ever limited as to growth. Only the most efficient, the best trained and the adequately financed can hope to survive. In general, our studies indicate that the would-be businessman should look more closely at consumer services. Consumer incomes are increasing. A larger portion of their spendings are going for services. In the service industries, the little businessman is not at such a comparative disadvantage as in retailing or manufacturing. Wit, ingenuity and imagination are at a premium.

PB-170 107 **Field 5C, 8F**
CFSTI Prices: HC$6.00 MF$1.50
Kirschner Associates, Albuquerque, N. Mex.
RECREATION AND TOURISM POTENTIAL ROUTE NO. 3-CHUSKA AREA NAVAJO RESERVATION.
Sep 65, 282p
Contract Cc-6163

Descriptors: (*Economics, Arizona), (*Recreation, Economics), Utah, New Mexico, Lakes, Mountains, Roads, Terrain, Natural resources, Costs, Feasibility studies, Commerce, Employment, Traffic.

Identifiers: Area redevelopment, Indian reservations, Tourist industry, Recreation facilities, Indians.

The basic purpose of this project is to recommend programs for the development of the commercial aspects of recreation and tourism in the Route no. 3 and Chuska areas of the Navajo Reservation that will improve the economic status of the Navajo people. This project has two principal phases: First, to determine the market for the types of attractions existing or possible to develop in the study area of the Navajo Reservation; and, second, to recommend an economically sound development program to serve the present and anticipated market. Consideration has been devoted particularly to the period from 1965 through 1975 although certain longer range programs have been suggested. A program and plans have been recommended for the physical development of feasible projects. To achieve the recommended physical developments, suggestions have been offered as to the most desirable financial, management and operating arrangements. The economic aspects of this project have received primary emphasis. However, consideration has also been devoted to the historic, cultural and social values of the Navajo people and their lands. The development programs recommended are designed not only to serve tourists and provide income for Navajos, but also to relate harmoniously to the land and to the life and aspirations of the Navajo people.

PB-170 192 **Field 5C, 8F**
CFSTI Prices: HC$2.00 MF$0.50
Brown and Root, Inc., Houston, Texas.
MARKET STUDY FOR TOURIST AND RECREATIONAL FACILITIES FOR THE ALABAMA - COUSHATTA INDIAN RESERVATION, POLK COUNTY, TEXAS.
1964, 43p
Prepared in cooperation with Area Redevelopment Administration, Washington, D. C.

Descriptors: (*Economics, Texas), (*Recreation, Economics), Traffic, Population, History, Culture, Geography, Employment, Commerce, Feasibility studies, Natural resources, Roads.

Identifiers: Area redevelopment, Recreation facilities.

The purpose of the study is to analyze the market-potential for proposed tourist recreation facilities at the Alabama-Coushatta Indian Reservation near Livingston in Polk County, Texas. The data thus developed and the resulting recommendations can then be used as basis for determining the feasibility of various development schemes, and for decisions concerning the degree of development on the Reservation. The study is organized to show a logical analysis of market potential showing: (A) The present traffic and tourist situation in the area and in the state, with estimates of the number of visitors passing through the area. (B) Projections and estimates of future tourist potential, based on traffic estimates and population studies. (C) Studies of various suitable tourist and recreational facilities. (D) Recommendations for development of the Indian Reservation, based on the market potential and relative attractiveness of the various facilities, and upon the compatibility with the historical and cultural background of the Alabama-Coushatta Indians. (E) The anticipated socio-economic effects on the Reservation and the surrounding area.

6. BIOLOGICAL AND MEDICAL SCIENCES

N66-10438 **Field 6P**
CFSTI Prices: HC$5.00 MF$1.25
Technische Hogeschool, Eindoven (Netherlands).
RECEPTIVE SYSTEMS. MEDIATING CERTAIN LIGHT REACTIONS OF THE PUPIL OF THE HUMAN EYE.
Doctoral thesis,
by H. Bouma. 19 Jan 65, 185p

Descriptors: *Eye, *Light absorption, *Pupil.

N66-13507 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Karolinska Institutet, Stockholm (Sweden).
LIFE STRESS AND URINARY EXCRETION OF ADRENALINE AND NORADRENALINE,
by L. Levi. 1965, 15p
Prepared for Presentation at Inter. Conf. on Preventive Cardiology (1st), Burlington, Vt. 1964.

Descriptors: *Epinephrine, *Norepinephrine, *Endocrine system, *Mental stress, *Physiological response, *Stress /biol/, *Urination.

N66-14764 **Field 6K**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
AN OPEN CYCLE LIFE SUPPORT SYSTEM FOR MANNED INTERPLANETARY SPACEFLIGHT,
by J. R. Roth. 1965, 23p
NASA TM-X-52140
Presented at the AIAA and AM. Astronautical soc. Stepping Stones to Mars Meeting, Baltimore, 28-30 Mar 1966.

Descriptors: *Interplanetary flight, *Life support system, *Manned space flight.

N66-15239 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Miami Univ., Coral Gables, Fla.
EXPERIMENTS SUGGESTING EVOLUTION TO PROTEIN,
by S. W. Fox. 1964, 20p
Contract NsG-689
NASA CR-59829

Descriptors: *Amino acid, *Dry heat, *Biological cell, *Evolution, *Protein.

N66-17053 **Field 6S**
CFSTI Prices: HC$4.00 MF$0.75
International Business Machines Corps., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART VII. BIOMEDICINE/BEHAVIOR.
21 Feb 66, 110p
Contract NASw-1215
NASA CR-70356

Descriptors: *Manned orbital research laboratory (Morl), *Medicine (Gen), *Physiological defense, *Experiment design, *Human behavior.

N66-17058 **Field 6F**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART XII. BIOSCIENCE.
21 Feb 66, 123p
Contract NASw-1215
NASA CR-70342-Vol-B-Pt-12

Descriptors: *Bioastronautics, *Evolution, *Experiment design, *Manned orbital research laboratory (Morl).

N66-17072 Field 6P
CFSTI Prices: HC$1.00 MF$0.50
Thorndike Memorial Lab., Harvard Univ., Boston, Mass.
A STUDY OF PHYSIOLOGICAL MECHANISMS AND INTER-RELATIONS BETWEEN SYSTEMIC AND REGIONAL BLOOD VOLUME, BLOOD FLOW AND ELECTROLYTE BALANCE.
Interim progress rept.,
by W. H. Abelman and L. E. Earley. 31 Dec 65, 10p
Grant NsG-595
NASA CR-70316

Descriptors: *Physiology, *Renal function, *Sodium, *Blood flow, *Heart function.

N66-17079 Field 6N
CFSTI Prices: HC$1.00 MF$0.50
Naval Aerospace Medical Inst., Pensacola.
THE VALIDITY OF A BRIEF VESTIBULAR DISORIENTATION TEST IN SCREENING PILOT TRAINEES,
by R. K. Ambler and F. E. Guedry, Jr. 18 Oct 65, 16p NAMI-947
Contract R-47
NASA CR-70306

Descriptors: *Pilot selection, *Screening technique, *Vestibular test, *Human performance.

PB-169 357 Field 6R
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ACTION DE 50 R DE RAYONS X SUR LA FONCTION DE REPRODUCTION DES SOURIS DE RACE C3H INFLUENCE DU FRACTIONNEMENT. ACTION DE LA REPETITION DES IRRADIATIONS AU COURS DES GENERATIONS SUCCESSIVES (Action of 50 R X-Ray Doses on the Breeding Function of C3H Strain Mice. Effect of Splitting the Dose, Action of Repeated Irradiations on successive Generations,
by Denise Alix. Dec 65, 29p CEA-R-2874
Text in French; Attached Summary in English.

Descriptors: (*Mice, Reproduction (Physiology)), (*Reproduction (Physiology), Radiation effects), (*Radiation effects, Reproduction (Physiology)), X-rays, Whole body irradiation, Dosage, Fertility, Ovaries, Sensitivity, Mutations, Birth, France.

X-ray exposure effect was studied on C3H strain mice, from the standpoint of the effects produced on breeding function. The method used for this purpose was the following: single doses 20 - 30-40 and 50 R/dose, fractional doses: 50 R/total dose, divided in 2 - 5 - 10 or 25 irradiations distributed in one month duration. The offspring were irradiated at the same doses than the parents, consanguinity being maintained. Couples receiving single exposure of 50 R or two exposures of 25 R at one month intervals give comparable results. Fractional doses do not involve the slightest diminution of X-ray effects. 30 R exposure brings about a decrease in fertility, with an increase in abortions. Fertility of 20 R irradiated couples remains below controls. After ten times 5 R and twenty-five 2 R, the number of abortions is the largest. Ovarian function is particularly sensitive to X-rays; one may think that twenty-five 2 R give injuries conditioning non-viability of conception products, smaller doses should produce mutations and yield births of altered genotype individuals. (Author)

PB-169 362 Field 6O, 6R
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ETUDE DE LA REPARTITION DU BENZIMIDAZOLE 14C CHEZ LA SOURIS APRES INJECTION INTRAPERITONEALE (Study of the 14C Benzimidazole Distribution in Mice after Interperitonal Injection),
by Carlos Tyortyalian. Nov 65, 15p CEA-R-2899
Text in French; Attached Summary in English.

Descriptors: (*Radioprotective agents, Tracer studies), (*Benzimidazoles, Tracer studies), Tissues (Biology), Distribution, Autoradiography, Mice, Gastrointestinal system, Excretion, France.

In order to provide further information on the mechanism of benzimidazole radioprotective activity, studies were conducted on the tissular repartition in mice of this compound labelled with carbon 14. Experiments showed that benzimidazole distribution is fast and homogeneous in all the tissues, but affinity appears at the level of stomach and gastric content. Elimination is made through the urinary system and is very fast. (Author)

PB-169 525 Field 6C
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre de l'Etudes Nucleaires.
NOTE TECHNIQUE SUR LA REALISATION D'UNE CULTURE CONTINUE ET AXENIQUE DE CHLORELLES. DESCRIPTION D'UN BIOSTAT (Technical Paper on the Realisation of a Continuous Axenic Culture of Chlorella. Description of a Biostat),
by Jacques Dalmon and Roland Gilet. Mar 66, 15p CEA-R-2920
Text in French; Attached Summary in English.

Descriptors: (*Algae, Laboratory equipment), (*Chlorella, Laboratory equipment), Growth, Culture media, France.

Identifiers: Biostats.

An apparatus for the continuous cultivation of chlorella is described with the means that allowed to keep axenic cultures for several months. (Author)

PB-169 528 Field 6R, 6H
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ESSAIS RELATIFS AU DOSAGE DE L'IODE 131 DANS LE LAIT AU MOYEN D'ECHANGEUR D'ION ANIONIQUE (Tests on the Measurement of Iodine-131 in Milk Using Anionic Ion-Exchangers),
by Lucien Jeanmarie, Francois Patti, Marie-Louise Daburon, Roger Gros, and Suzanne Bertrand. Jan 66, 12p CEA-R-2897
Text in French; Attached Summary in English.

Descriptors: (*Milk, Radiological contamination), (*Radiological contamination, Milk), (*Iodine, Radioactive isotopes), Bovines, Ingestion (Physiology), Ion exchange, France.

The milk produced by a cow contaminated by a single ingestion was passed over a Dowex 1 resin to fix the iodine it contained. The percentage amount fixed, originally around 100 per cent, falls to 50 per cent after 15 days. (Author)

PB-169 532 Field 6R
CFSTI Prices: HC$1.60 MF$0.50
Commissariat l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
EVOLUTION DE LA GLYCEMIE CHEZ LE RAT APRES IRRADIATION GAMMA (Evolution of Glycemia in the Rat after Gamma Irradiation),
by Georges Marble, Henri Frossard, Lucien Breuil, and Robert Engler. Dec 65, 14p CEA-R-2922
Text in French; Attached Summary in English.

Descriptors: (*Radiation effects, Metabolic diseases), (*Hyperglycemia, Radiation effects), (*Hypoglycemia, Radiation effects), Rats, Gamma rays, Whole body irradiation, Dosage, France.

The study of glycemia variations in the rat after irradiation made it possible to observe not only a premature hyperglycemia but also a belated hypoglycemia whose importance and subsequent evolution seem to depend on the dose given to the animal. (Author)

PB-169 536 Field 6R, 7E, 6A
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ETUDE DE LA CINETIQUE DE LA TRANSFORMATION FIBRINOGENE-FIBRINE ET MODIFICATIONS APPORTEES DANS CETTE REACTION PAR IRRADIATION (RAYONS X) DE SOLUTION DE FIBRINOGENE (Study of the FibrinogenFibrin Transformation Kinetics and Modifications Caused to this Reaction by Irradiation (X Rays) of the Fibrinogen Solution),
by Daniel Hollard, Michel Suscillon, Genevieve Marcille, Francoise Rambaud, and Marie Baloyan. Feb 66, 15p CEA-R-2949
Text in French; Attached Summary in English.

Descriptors: (*Radiation effects, Blood coagulation), (*Blood coagulation, Radiation effects), (*Fibrinogen, Radiation effects), (*Fibrin, Radiation effects), X Rays, Reaction kinetics, Spectroscopy, Decomposition, Polymerization, Thrombin, Gels, France.

A spectrophotometric method is presented for studying the transformation fibrinogen - fibrin. This method has the advantage of drawing immediately, in graph form, the three phasis of this transformation: (1) proteolyse or monomerisation, (2) polymerisation, and (3) clot stabilization. It is a simple, faithful and easily reproduced technic. Using this method, modifications of this transformation due to irradiation of fibrinogen solution were studied. Low doses (90 000 R/mn) prevent transverse polymerisation. To upper doses (180 000 R and more), the action of thrombine on fibrinogen does not give an organized clot but a lacteous and fragile gel. Coagulation, in the physiological sense, is not involved. (Author)

PB-169 873 Field 6N, 1C, 13L
CFSTI Prices: HC$1.60 MF$0.50
Civil Aeromedical Research Inst., Oklahoma City, Okla.
DETERMINATION OF CENTERS OF GRAVITY OF CHILDREN, SITTING AND STANDING,
by John J. Swearingen and Joseph W. Young. Aug 65, 14p
AM 65-23

Descriptors: (*Aircraft seats, Safety harness), (*Safety harness, Children), (*Children, Center of gravity), Seats, Anthropometry, Aviation accidents, Safety.

There have been numerous instances in which small children have been thrown out over the top of the seat belt in rough air and airline crashes, indicating that the present seat belt is not a satisfactory restraint device for children 2 to 10 years old. Data defining the location of the center of gravity of children of different ages in the sitting position have not been available and are urgently needed to serve as a basis for developing an improved restraint system for children. To supply these data for design requirements approximately 1,200 children (ages 5 to 18) were balanced on a specially designed center-of-gravity machine in sitting and standing positions. The center of gravity of small children in the standing position will be most use-

219-841 O - 66 - 19

ful in the design of flotation equipment. This study shows that the center of gravity for small children sitting in an airline seat is located roughly 5 in. above the seat belt and explains why children slip out over the seat belt during crash decelerations. Complete data of location of centers of gravity along with anthropometric data of the children studied are presented. (Author)

PB-169 921 **Field 6L**
National Cancer Institute, Bethesda, Md.
NCI - IBM IN VIVO BLOOD CELL SEPARATOR.
1966, film
Available in 35mm reels, 365 ft for $75.00.

Descriptors: (*Blood cells, Separation), (*Medical equipment, Blood cells), Blood, Hematology, Medical supplies, Centrifuges, Anticoagulants.

The in vivo cell separator is a machine that is designed to allow removal of a donor's blood from a vein. As the blood is removed from the vein, anticoagulant is metered into the blood. The blood is pumped first to a small plastic bag called a buffer bag. From the buffer bag, the blood runs by gravity into a rotating centrifuge that has a volume of 130 cc. Inside the rotating centrifuge, the blood is separated into certain of its components including red cells, white cells, plasma, and platelets. These fractions are removed separately on a continuous flow basis from the centrifuge. Upon removal from the centrifuge, one or more of these fractions can be diverted into a sterile plastic bag, the remaining fractions recombine and are returned to a second vein of the donor. (Author)

PB-169 967 **Field 6E, 5A**
CFSTI Prices: HC$3.00 MF$0.50
Avco Everett Research Lab., Everett, Mass.
STUDIES BASIC TO CONSIDERATION OF ARTIFICIAL HEART RESEARCH AND DEVELOPMENT PROGRAM.
Final rept.
1966, 59p
Contract PH-43-66-7

Descriptors: (*Heart, Mechanical organs), (*Mechanical organs, Medical research), (*Medical research, Heart), Research program administration, Cardiovascular system, Pumps, Blood circulation, Fluid mechanics, Reliability, Life expectancy, Main tenance, Power supplies, Energy conversion, Materials, Electronic equipment, Medical supplies, Surgical supplies, Hematology, Heat production (Biology), Control systems, Medical personnel, Costs, Implants.

It is concluded that Artificial Heart devices are desirable and attainable, but that a significant and properly-directed effort is required. Salient points of the findings are: (1) From 10,000 to 100,000 cases per year, depending on age limits, could benefit from a permanent Artificial Heart device. A temporary device could benefit many of the more than 60,000 to 90,000 acute cardiac emergency cases per year. (2) Information now available on methods of temporary cardiac support, permanent ventricular support and total heart substitution permits identification of relevant biomedical problems; the relevant technological problems can in turn be identified in their context. (3) A detailed survey of relevant technologies and of their probable progress in the next decade shows a body of knowledge sufficient for empirical design of early experimental devices, but not sufficient for rational design of devices for routine clinical use. The technological gaps have been identified for attention. (4) Other resources required by an Artificial Heart program - research, development and production, clinical facilities and personnel, maintenance, economics and others - can be made available if adequate preparations are made. (5) Ethical, moral and legal questions posed by Artificial Hearts demand consideration before devices are completely developed. (Author)

7. CHEMISTRY

AD-462 259 **Field 7C**
CFSTI Prices: HC$2.60 MF$0.50
Florida Univ., Gainesville. Dept. of Chemistry.
RESEARCH ON SYNTHESIS OF UNSATURATED FLUOROCARBON COMPOUNDS.
Semi-annual rept. no. 2, 1 Oct 63-31 Mar 64,
by Paul Tarrant, Jim Heyes, David Sayers, Ward Oliver, and A. C. Wright. 31 Mar 64, 26p
Contract DA-19-129-AMC-79 (N)

Descriptors: (*Alkenes, Fluorine compounds), (*Fluorine compounds, Synthesis (Chemistry)), Grig nard reactions, Spectra (Infrared), Chromatographic analysis, Ketones, Chemical reactions, Alcohols, Nuclear magnetic resonance, Silanes, Siloxanes, Cyclobutanes, Cyclobutenes, Aromatic compounds, Elastomers.

Allyl magnesium bromide has been found to react with a number of fluoroolefins to give reasonable yields of the 1,4-dienes. The reaction of fluoroolefins with vinyl organometallics and the mono- and di-metallic acetylenes proved unsuccesful. The codimerization of CF 2=CFBr and CF 2CF CH2CH2Br was carried out and some reactions of the product were investigated. The preparation of the 1,2-bis (pentafluorophenyl) hexafluorocyclo-1-butene is described. The reaction of highly fluorinated ketones with some organometallic compounds to give tertiary carbinols has been investigated. Silanes with trifluorovinyl group have been prepared. (Author)

N66-10193 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
ELECTRODE OVERVOLTAGES IN MOLTEN FLUORIDES. III. THE ANODIC BEHAVIOR OF NICKEL ELECTRODES IN MOLTEN K F- NI F2, K F- NA FLI F, K F- NA F AND K F- LI F MIXTURES,
by R. Morlotti, S. Pizzini, and E. Romer. 1965, 25p EUR-804.E

Descriptors: *Fluoride, *Molten-salt electrolyte, *Overvoltage, *Diffusion electrode.

N66-10209 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
OSCILLOGRAPHIC POLAROGRAPHY OF OXYGEN IONS IN MOLTEN NITRATES,
by M. Francini and S. Martini. 1965, 31p EUR-2496.E
Prepared for presentation at Meeting of Electrochem. Soc., San Francisco, 9-13 May 1965.

Descriptors: *Oscillograph, *Oxygen, *Ion, *Nitrate, *Polarography.

N66-10472 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Liege Univ. (Belgium).
PHYSICO-CHEMICAL RESEARCH ON THE TRANSPLUTONIUM ELEMENTS,
by F. Caligara, Ph. Dreze, G. Duyckaerts, J. Fuger, and J. Goffart. 1965, 30p
Contract EURATOM-003-61-2
EUR 2297.E

Descriptors: *Organic liquid, *Plutonium, *Ion distribution.

N66-10500 **Field 7B, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Osterreichische Studiengesellschaft fur Atomenergie G.M.B.H., Seibersdorf (Austria). Physik Inst.
SOURCE THICKNESS EFFECT IN BETA-SPECTROSCOPY,
by H. Baier and I. Hofmann. 1964, 8p SGAE-PH-13/1964
Prepared for presentation at Fall Meeting of Austrian Physics Society, Graz, 1964.

Descriptors: *Spectroscopy, *Beta radiation, *Sodium 24.

N66-11724 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy Commission Research Establishment, Lucas Heights (Australia).
MICROHARDNESS MEASUREMENT OF UNIRRADIATED AND IRRADIATED BERYLLIUM OXIDE,
by P. J. Davis. Apr 65, 14p AAEC-E-135

Descriptors: *Irradiation, *Radiation effect, *Beryllium oxide, *Hardness.

N66-11745 **Field 7C**
CFSTI Prices: HC$4.00 MF$0.75
Notre Dame Univ., Ind. Dept. of Chemistry.
FUNDAMENTAL STUDIES ON THE SYNTHESIS OF HEAT-RESISTANT POLYMERS. THE SYNTHESIS AND EVALUATION OF POLYMERIC SCHIFF BASES BY BIS-SCHIFF BASE EXCHANGE REACTIONS.
Progress rept. no. 6, 31 Jan-15 Sep 65,
by G. F. Dalelio. 15 Sep 65, 11p
Grant NsG-339
NASA CR-68042

Descriptors: *Monomer, *Synthesis, *Heat resistance, *Polymer chemistry.

N66-13706 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Aktiebolaget Atomenergi, Stockholm (Sweden).
IMPROVEMENTS IN APPLIED GAMMA-RAY SPECTROMETRY WITH GERMANIUM SEMICONDUCTOR DETECTOR,
by D. Brune, J. Dubois, and S. Hellstrom. Jan 65, 18p AE-174

Descriptors: *Detector, *Germanium, *Semiconductor, *Spectrometry.

N66-13919 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Weapons Research Establishment, Aldermaston (England).
THE PERMEATION AND DIFFUSION OF HYDROGEN ISOTOPES THROUGH STAINLESS STEELS. PART I. NIOBIUM STABILISED S110 STEEL,
by J. A. Evans, R. Gibson, and P. M. S. Jones. Sep 65, 32p AWRE-0-47/65

Descriptors: *Diffusion, *Niobium, *Deuterium, *Hydrogen.

N66-14081 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Aeronautical Research Labs., Melbourne (Australia).
THE DETERMINATION OF CADMIUM IN STAINLESS STEEL BY ATOMIC ABSORPTION SPECTROSCOPY,
by L. Wilson. Jul 65, 11p ARL/MET-244

Descriptors: *Cadmium, *Quantitative analysis, *Spectroscopy, *Absorption spectrum, *Stainless steel.

N66-14140 **Field 7B, 7C, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Osterreichische Studiengesellschaft Fur Atomenergie G.M.B.H., Seibersdorf (Austria).

INSTRUMENTAL DISTORTION OF BETA SPECTRA MEASURED IN AN INTERMEDIATE-IMAGE SPECTROMETER,
by H. Paul. 1965, 39p SGAE-PH-21/1965

Descriptors: *Beta radiation, *Distortion, *Radiation spectrum, *Spectrometer.

N66-14296 **Field 7A**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Evendale, Ohio. Materials Development Lab. Operation.
BROMINE TRIFLUORIDE METHOD FOR OXYGEN IN LIQUID ALKALI METALS.
Quarterly rept. no. 2, 1 Apr-30 Jun 64,
by S. Culp, H. Kirtchik, and T. Lajcik. 17 Jul 64, 34p DM-64-277
Contract NASw-882
NASA CR-68975

Descriptors: *Bromine, *Potassium, *Measuring apparatus, *Oxygen, *Trifluoride.

N66-15787 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Mallory (P. R.) and Co., Inc., Burlington, Mass. Lab. for Physical Science.
RESEARCH AND DEVELOPMENT OF A CAPACITY NONAQUEOUS SECONDARY BATTERY.
Quarterly rept. no. 4, Jul-Sep 65,
by K. R. Hill, M. L. B. Rao, and R. G. Selim. 11 Nov 65, 91p
Contract NAS3-6017
NASA CR-54874

Descriptors: *Deposition, *Purification, *Battery, *Cathode, *Lithium.

NBS-TN-284 **Field 7D, 20F**
CFSTI Prices: HC$0.15 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
AN OUTLINE FOR COOPERATIVE ACTION ON THE DETERMINATION OF X-RAY MASS ATTENUATION COEFFICIENTS IN THE WAVELENGTH RANGE FROM 0.5 TO 100 A (25 to 0.12 keV),
by Kurt F. J. Heinrich. 21 Feb 66, 18p
Hard copy available from Superintendent of Documents, GPO. Washington, D. C., 20402, $0.15, as C13.46:284.

Descriptors: (*Absorption spectrum, Mass spectroscopy), (*Mass spectroscopy, X-ray absorption analysis), (*X-ray absorption analysis, Mass spectroscopy), Fluorescence.

Sources of information on x-ray mass attenuation coefficients and the present status of data in this area are reviewed. Many gaps are observed in the existing data and some values derived by interpolation may be of questionable accuracy. Because of the importance of accurate mass attenuation coefficients, the extension and improvement of these measurements is proposed together with a plan for coordination of effort and exchange of information. (Author)

PB-169 356 **Field 7D, 7C, 20F**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre a d'Etudes Nucleaires.
COMPARASON DE QUELQUES METHODES D'ANALYSE DES PROPRIETES OPTIQUES DES AGREGATS MOLECULAIRES (Comparison of Some Methods for Analyzing the Optical Properties of Molecular Aggregates),
by Jean Thiery. Dec 65, 20p CEA-R-2878
Text in Franch; Attached Summary in English.

Descriptors: (*Molecular association, Optical properties), (*Molecular rotation, Theory), (*N-heterocyclic com pounds, Molecular rotation), Molecular energy levels, Excitation, Polarization, Chemical bonds, Dyes, Absorption spectrum, Concentration (Chemistry), Nucleic acids, France.

Identifiers: Diethyl cyanines, Hypochromism.

The report compares the application both of the exciton theory and of the polarizability theory to the study of the optical properties of dimers made up of two identical molecules having only one excited level when separate, and which are held together in the dimer only by Van der Waals forces to the exclusion of any covalent bonding. Using this theoretical basis, an interpretation is given of the changes in the spectrum of aqueous NN'-diethylcyanine solutions as a function of concentration, and stresses the present lack of experimental data necessary for understanding of the mechanism of the hypochromism of nucleic acids. (Author)

PB-169 363 **Field 7D, 20I, 18A, 20F**
CFSTI Prices: HC$4.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
PROFILS THEORIQUES DES RAIES SPECTRALES DE L'ATOME D'HYDROGENE (Theoretical Profiles of the Spectral Lines of the Hydrogen Atom),
by Hoe Nguyen, Hans-Werner Drawin, andLouis Herman. Dec 65, 47p CEA-R-2912
EUR 2630-F
Text in French; Attached Summary in English.

Descriptors: (*Hydrogen, Line spectrum), (*Plasma medium, Line spectrum), (*Line spectrum, Theory), Ions, Electrons, Atomic spectroscopy, Electric fields, Equations, France.

The line-broadening problem of the hydrogen lines was formulated in the quasistatic approximation as far as the ions are concerned, and in the classical path approximation as far as the broadening due to collisions with electrons is concerned. These electrons interfere in different numerical results only by the self-correlation function of the fluctuating electrical field strength created at each point in the plasma. The Lewis correction was applied, but using the whole velocity distribution function of the electrons. The formula which represents the usual impact profile, valid only for frequencies much smaller than the plasma frequency, was extended using another formula which will be valid up to the neighbourhood of that spectral region where the quasi-static approximation begins to be valid also for the electrons. As an example, the line profile of Ly alpha is given by some graphs for T = 10000K and electron densities N = 10 to the 17th power cm to the -3 and N = 10 to the 18th power cm to the -3. (Author)

PB-169 453 **Field 7C, 11I**
CFSTI Prices: HC$1.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE THERMAL DECOMPOSITION OF 4,4'-BIS (PENTAFLUOROPHENYL THIO) OCTAFLUOROBIPHENYL,
by N. S. J. Christopher and J. L. Cotter. Oct 65, 14p Technical rept. no. TR-65217

Descriptors: (*Fluorine compounds, Pyrolysis), (*Halogenated hydrocarbons, Pyrolysis), (*Organic sulfur compounds, Pyrolysis), Polycyclic compounds, Thermal stability, Vacuum, Decomposition, Sulfides, Halocarbon plastics, Simulation, Great Britain.

Identifiers: Bis (pentafluorophenyl thio) Octafluorobiphenyl.

The thermal decomposition of 4,4'-bis (pentafluorophenyl thio) octafluorobiphenyl was studied in vacuum at 450C and 500C. After one hour, at the lower temperature about 85 per cent decomposition had occurred, and at 500C the compound was almost completely decomposed. The principal pyrolysis products at both temperatures were bis (pentafluorophenyl)sulphide, and involatile residues which comprised about 50 per cent of the total weight of the pyrolysis mixtures. (Author)

PB-169 458 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
DETERMINATION OF PHOSPHORUS IN ORGANIC COMPOUNDS ON THE CENTIMILLIGRAM SCALE,
by A. J. Christopher and T. R. F. W. Fennell. Nov 65, 11p Technical rept. no. TR-65251

Descriptors: (*Organic phosphorus compounds, Microanalysis), (*Microanalysis, Phosphorus), Phosphates, Calorimetric analysis, Complex compounds, Molybdenum compounds, Vanadium compounds, Spectra (Visible ; ultraviolet), Absorption spectrum, Great Britain.

Samples, of average weight less than 100 micrograms, are decomposed in a sulphuric-perchloric acid mixture in an open tube. The quantity of phosphate formed is measured by the absorbance of the phosphovanadomolybdate complex at 315 millimicrons. Results are usually within plus or minus 0.3% absolute of the calculated value. Solids and involatile, non-hygroscopic liquids, some containing bromine, fluorine, nitrogen or silicon, successfully analysed, but some fluorinated compounds resist acid attack. Advantages and disadvantages of the determination of phosphate by ultraviolet absorption are discussed. (Author)

PB-169 479 **Field 7E, 18J**
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ETUDE CINETIQUE DE LA FLUORATION PAR LE FLUOR DE QUELQUES COMPOSES DE L'URANIUM ET DU PLUTONIUM (Kinetic Study of the Fluorination by Fluorine of Some Uranium and Plutonium Compounds).
Doctoral thesis in French,
by Gerard Vandenbussche. 17 Dec 64, 91p
CEA-R-2859
Text in French; Attached Summary in English.

Descriptors: (*Uranium compounds, Fluorination), (*Plutonium compounds, Fluorination), (*Fluorination, Reaction kinetics), Thermogravimetric analysis, Oxides, Oxyfluorides, Fluorides, Chlorides, Uranyl radicals, France.

Identifiers: Plutonium dioxide, Plutonium fluorides, Uranic oxide, Uranium chlorides, Uranium tetrafluoride, Uranium tritaoctoxide, Uranous oxide, Uranyl fluoride.

The study of fluorination reactions of uranium and plutonium compounds with elementary fluorine was carried out using a thermogravimetric method. These reactions are heterogeneous ones, and of the following type: S-solid + Gi-gas to G2-gas. The kinetics of these reactions correspond to a uniform attack at the entire surface of the sample. The mechanism of the reaction varies according to the nature of the compound. (1) With uranium tetrafluoride and plutonium tetrafluoride, the reaction proceeds in a single step. (2) With uranium oxides, the reaction proceeds in two steps, uranium oxyfluoride being the intermediate compound. (3) With plutonium oxyde, the reaction proceeds in two steps, plutonium tetrafluoride being the intermediate compound. (4) With uranium trichloride, the mechanism is complex. Chlorine trifluoride is formed. (Author)

PB-169 526 **Field 7D, 7C**
CFSTI Prices: HC$9.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.

ETUDE ELECTROCHIMIQUE DE PROPRIETES CHIMIQUES DANS L'ETHANOLAMINE ET SES MELANGES AVEC L'EAU (Electrochemical Study of Chemical Properties in Ethanolamine and Its Mixtures with Water).
Doctoral thesis in French,
by Marcel Grall. Feb 66, 92p CEA-R-2902
Text in French; Attached Summary in English.

Descriptors: (*Amines, Chemical properties), (*Alcohols, Chemical properties), (*Electrochemistry, Amines), (*Acid-base reactions, Amines), (*Complex compounds, Amines), Wastes, Solutions, pH, Reduction (Chemistry), Mercury compounds, Polar ographic analysis, Cyanides, France.

Identifiers: Ethanol amines, Mercuric cyanide.

The work was concerned with the study of acid-base reactions and of complex formation in ethanolamine and its mixtures with water. The ionic product of the solvent was determined by an electrochemical study of the H (+)/H2 system. The reduction curves for ethanolamine-water mixtures, for different acidities, have made it possible to follow the variations in the size of the pH domain as a function of the composition of the solvent. The electrochemical systems of mercury were studied by anodic polarography. In order to establish a parallel between the acid-base reactions and complex formation reactions, a study was made of the stability of Hg (CN)2 in water-ethanolamine mixtures. It was possible to deduce the law for the variation of pKc with solvent composition. The representative graph of this function passes through a minimum for a proportion of about 50 per cent of ethanolamine as in the case of acids. (Author)

PB-169 531 **FIELD 7B**
CFSTI Prices: HC$7.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
TITRAGES POTENTIOMETRIQUES DANS L'ACIDE ACETIQUE ANHYDRE (Potentiometric Titrations in Anhydrous Acetic Acid).
Doctoral thesis in French,
by Louis Le Port. Mar 66, 73p CEA-R-2904
Text in French; Attached Summary in English.

Descriptors: (*Volumetric analysis, Acetic acids), (*Acetic acids, Volumetric analysis), (*Inorganic acids, Volumetric analysis), (*Salts, Volumetric analysis), (*Complex compounds, Volumetric analysis), Pyridines, Chlorides, Dissociation, Chemical equilibrium, Perchlorates, Acetates, Hydrochloric acid, Perchloric acid, Hydrogen compounds, Bromides, Nitric acid, Phosphoric acid, France.

Identifiers: Hydrogen bromide, Pyridinium chlorides.

The method used for studying anhydrous acetic acid was potentiometry with a glass electrode. In this way, the titration of common inorganic acids was studied (HClO4, HBr, H2SO4, HCl, HNO3, H3PO4), as were some metallic salts. Furthermore it was found that complex acids are formed between HCl and some metallic chlorides. An analysis of the titration curves for the inorganic acids against pyridinium chloride made it possible to calculate a certain number of values for the dissociation pK of these acids and of the corresponding pyridinium salts. The titration of metallic perchlorates constitutes a method of studying the stability of acetates; it was thus possible to draw up a classification for some of these acetates. The metallic chlorides studied fall into two groups according to their behaviour in weak or strong acids. The differences are explained on the basis of the role played by solvolysis. The acidic properties of mixtures of HCl with certain metallic chlorides were also studied. This work demonstrated the existence, in certain cases, of acid complexes of the type (HCl) (m) MCl (n). (Author)

8. EARTH SCIENCES AND OCEANOGRAPHY

AD-463 320 **Field 8N, 4A**
CFSTI Price: HC$2.60
Wichita State Univ., Kansas.
STUDY OF MICROPULSATIONS OF ABOUT ONE CYCLE PER SECOND.
Final scientific rept., 1 Jan 63-31 Dec 64,
by Alvin W. Jenkins, Jr. and Bruce W. Duvall. 1 Jan 65, 29p
Contract AF 19 (628)-2477,
Proj. AF-8601,
Task 860104
AFCRL 65-98

Descriptors: (*Ionospheric disturbances, Magneto hydrodynamics), (*Magnetohydrodynamics, Ionospheric disturbances), Meteors, Upper atmosphere, Resonance, Attenuation, Ionosphere, Ions, Electric fields, Terrestrial magnetism.

An analysis is made of several possible sources for geomagnetic micropulsations of about one cycle per second. These include hydromagnetic waves propagated downward from the magnetospheric boundary, natural resonance of the ionospheric current system, sudden changes in ionospheric parameters, and the effect of meteors. The attenuation of hydromagnetic waves is calculated for an ionospheric model that include heavy negative ions. The results are inconclusive because of the technical difficulties involved in obtaining the mathematical solution. Resonance phenomena are found to produce effects at frequencies far removed from the one-cycle region. Meteor effects are a possible source of micropulsations at one cycle, and a detailed analysis is made for this case. (Author)

N66-10354 **Field 8E**
CFSTI Prices: HC$3.00 MF$0.75
Tohoku Univ., Sendai (Japan). Faculty of Science.
GEOPHYSICS, VOLUME 16, NO. 2,
by G. Yamamoto. Mar 65, 74p Scientific-5

Descriptors: *Geomagnetic micropulsation, *Geophysics, *Solar corpuscular stream, *Atmospheric refraction, *Eddy diffusion, *Geomagnetic field, *Solar eclipse, *Sound wave.

N66-11655 **Field 8A**
CFSTI Prices: HC$2.00 MF$0.50
Comitato Nazionale Per L Energia Nucleare, La Spezia (Italy).
STUDIES ON THE RADIOACTIVE CONTAMINATION OF THE SEA.
Annual rept. for 1964,
by M. Bernhard. 1965, 36p
Contract EURATOM-C24-63-2 BIAI
EURN 2543.E,
RT-B10 65-18

Descriptors: *Radioactive contamination, *Ocean.

N66-12667 **Field 8F**
CFSTI Prices: HC$5.00 MF$1.25
Advisory Group for Aerospace Research and Development, Paris (France).
SIMULATION FOR AEROSPACE RESEARCH,
by C. W. Harper. Feb. 64, 186p Agerdograph-99.
Prepared for presentation at Agard Flight Mech. Panel Meeting (24th), Ames Res. Ctr., Calif., Feb 64.

Descriptors: *Conference, *Midcourse guidance, *Research facility, *Computer simulation, *Flight simulation, *Takeoff ; landing, *V/stol aircraft.

N66-14283 **Field 8G**
CFSTI Prices: HC$6.00 MF$1.25
Arizona State Univ., Tempe.
CATALOG OF METEORITES IN THE COLLECTIONS OF ARIZONA STATE UNIVERSITY, INCLUDING THE NININGER METEORITE COLLECTION,
by C. F. Lewis and C. B. Moore. 1964, 209p
Grant NsG-399
NASA CR-68989

Descriptors: *Meteorite.

N66-17048 **Field 8H**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART II. GEOLOGY/HYDROLOGY.
21 Feb 66, 153p
Contract NASw-1215
NASA CR-70358Vol-B-Pt-2

Descriptors: *Experiment design, Geology, *Manned orbital research laboratory (Morl), *Hydrology.

N66-17049 **Field 8J**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART III. OCEANOGRAPHY/MARINE TECHNOLOGY.
21 Feb 66, 121p
Contract NASw-1215
NASA CR-70348

Descriptors: *Experiment design, *Manned orbital research laboratory (Morl), *Oceanography.

N66-17050 **Field 8F**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART IV GEOGRAPHY.
21 Feb 66, 128p
Contract NASw-1215
NASA CR-70349

Descriptors: *Experiment design, *Manned orbital research laboratory /morl/, *Geography.

N66-17061 **Field 8G, 8C**
CFSTI Prices: HC$4.00 MF$1.00
International Business Machines Corp., Rockville, Md. Federal Systems Div.
ORL EXPERIMENT PROGRAM, VOLUME C. ANNEX 1-GUIDELINES FOR COMPREHENSIVE FLIGHT PROGRAM.
21 Feb 66, 168p
Contract NASw-1215
NASA CR-70341

Descriptors: *Geology, *Manned orbital research laboratory (Morl), *Navigation system, *Communication system, *Experiment design.

N66-17080 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Northrop Space Labs., Hawthorne, Calif.
DEVELOPMENT OF TECHNOLOGICAL CONCEPTS LEADING TO BENEFICIAL USE OF LUNAR MAGMA PRODUCTS.
Quarterly technical progress rept. no. 3, Oct-Dec 65,
by E. Azmon. 1965, 9p
Contract NAS7-358
NASA CR-70307

Descriptors: *Meteoritic composition, *Phase transformation, *Rock, *Solid phase.

PB-169 529 **Field 8D, 18H, 1B, 4A, ;**
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a L'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CONTRIBUTION A L'ETUDE DU COMPORTEMENT GEOPHYSIQUE DU PLOMB 210 PAR APPLICATION DE LA SPECTROMETRIE ALPHA (Contribution to the Study of the Geophysical Behaviour of Lead-210 by Application of Alpha Spectrometry).
Doctoral thesis in French,
by Mehdi Nezami. 18 Jun 65, 89p CEA-R-2886
Text in French; Attached Summary in English.

Descriptors: (*Lead, Geophysics), (*Alpha particle spectroscopy, Lead), (*Polonium, Separation), (*Rainfall, Radioactive isotopes), (*Ice, Radioactive isotopes), Water, Alpha spectra, Radioactive fallout, Solar radiation, Radon, Alpha particle detectors, Semiconductor devices, Troposphere, Aerosols, Geological age determination, France.

A study of the changes in the lead-210 contents of rain-water and of water produced by melting polar ice has required the development of a method for dosing lead-210, on alpha emitter. This method is 40 times more sensitive than that which measures the lead-210 by bismuth-210, a beta emitter. The first part of the report presents the study of alpha spectrometry using semiconductor detectors; a catalogue of alpha spectra shows the advantages of this method. In the second part will be found at first a new chemical separation method for polonium-210 and the results obtained with this method. The main results obtained on the geophysical behaviour of lead-210 are the following: the monthly lead-210 and plonium-210 contents in rain water are approximately constant with time; in the Gif-sur-Yvette region, the clean-up by 'dry fall-out' can attain 40 to 50 per cent of the total fall-out; a study of Antarctic ice samples makes it possible to determine an annual accumulation rate equivalent to 13.8 cms of water and to show discrepancies in the periodic concentrations which correspond to the latest maxima of solar activity; a balance is drawn up between the radon produced by the continents and the lead-210 fall-out. (Author)

PB-169 754 **Field 8G, 8F, 5C**
CFSTI Prices: HC$3.00 MF$0.75
Burns and Roe, Inc., New York.
MINERAL RESOURCES STUDY INDIAN RESERVATIONS MINNESOTA AND WISCONSIN.
Final rept.,
by W. G. Thorpe. 15 Apr 64, 94p
Contract 14-20-0650-1081

Descriptors: (*Minerals, Natural resources), (*Minnesota, Minerals), (*Wisconsin, Minerals), (*Economic geology, Minerals), Economics, Geophysical prospecting, Iron, Ores (Metal sources), Sand, Gravel, Coal, Sulfides, Clay, Rock (Geology), Pigmatite, Copper, Nickel.

Identifiers: Peat.

The purpose of the study was to locate any deposits of potentially commercial minerals on various Indian reservation lands in Minnesota and Wisconsin. These investigations have shown the presence of a highly ferruginous slate on the Red Lake Reservation which, through beneficiation, might be developed as a commercial iron ore. The magnetic indications suggest a fairly large ore body. Further investigation will be required to fully evaluate this prospect. There are deposits of peat on the Fond du Lac, Red Lake and Nett Lake Reservations which are extensive enough to support a commercial development. All of the reservations studied contain deposits of sand and gravel which have been worked at one time or another. Continued intermittent use of these sources can be expected. None of the Reservations studied, with the exception of Red Lake, are uniquely endowed with mineral deposits that could not be discovered on any area of like size in northern Minnesota.

PB-169 911 **Field 8J, 8F, 8H**
CFSTI Prices: HC$4.60 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
OCEANOGRAPHIC INVESTIGATION OF PORT NELLIE JUAN FIORD, ALASKA,
by R. B. Jones. 1959, 47p

Descriptors: (*Sounds, Alaska), (*Oceanology, Alaska), Gulfs, Bathythermograph data, Oceanographic data, Tides, Salinity, Temperature, Oxygen.

An oceanographic investigation was conducted in Port Nellie Juan fiord--along the west coast of Prince William Sound, Alaska--in May and June of 1959. This investigation included Nansen casts, bathythermograph observations, tide observations, current observations and bathymetric soundings. The report depicts the distribution of temperature, salinity, and oxygen throughout the fiord and presents the data obtained during the survey. (Author)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-443 456 **Field 9E, 17B**
CFSTI Price: HC$1.60
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
REDUCTION OF SHIPBOARD RADIO INTERFERENCE.
Status rept.
26 Jun 64, 19p Rept. no. 1522-8
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Radio interference, Ships), Radiofrequency interference, Reduction, Polarization, Antenna radia tion patterns, Scattering, Electromagnetic wave reflec tions, Antenna configurations, Dipole antennas, Medium frequency, High frequency, Equations, Mathematical analysis.

The report concerns the reduction of shipboard radio interference between strong transmitted signals and weak received signals. Fundamentally, there are only three modes of isolation for radiating devices; time, frequency, and space; that is, the antennas may be operated on a time-share basis so that during reception of a weak signal all transmitters are quiet; or, filters may be used in each antenna channel to sift out unwanted signals (this includes such techniques as servo-controlled phase cancellation); or, the antennas may be oriented so that coupling among them is minimized (this includes antenna polarization orientations). The third mode of isolation, i.e., antenna location, for reducing interchannel interference was investigated. A brief summary of this endeavor is given.

AD-443 833 **Field 9E, 17B**
CFSTI Price: HC$2.00
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
SCATTERING BY AN ARBITRARY ARRAY OF PARALLEL WIRES,
by Jack H. Richmond. 30 Apr 64, 31p Rept. no. 1522-7
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Antenna arrays, Antenna radiation patterns), (*Antenna configurations, Scattering), Electric wire, Geometric forms, Equations, Programming (Computers), Numerical analysis, Electromagnetic fields, Wire, Theory.

Equations are developed for the scattering pattern of an arbitrary array of parallel wires. The wires are assumed to be infinitely long, perfectly conducting, and very small in diameter in comparison with the wavelength. The incident wave is assumed to be TM with respect to the wire axis, but it may have normal or oblique incidence on the wires. The solution includes the interaction effects among all the wires. Computer programs are included along with numerical data for the currents induced in the wires in plane arrays, circular arrays, square arrays, and others. The far-field scattering patterns of these arrays are presented graphically. It is shown that if a sufficiently great number of wires is present the scattering pattern approaches that of a solid conducting cylinder of the same cross-section shape as the wire-grid array. In this connection, the theory may be applied to a shipboard situation in which a radiating element or an incoming plane wave illuminates the superstructure and the field distribution is thereby distorted. (Author)

AD-455 776 **Field 9E**
CFSTI Price: HC$8.60
Hughes Aircraft Co., Newport Beach, Calif.
SSB AND VHF CRYSTAL FILTERS.
Quarterly rept. no. 5, 15 Jun-15 Sep 64,
by E. C. Ho and R. H. Tuznik. 15 Sep 64, 85p

Contract DA-36-039-AMC-02305 (E)

Descriptors: (*Crystal filters, High frequency), Sidebands, Very high frequency, Design, Band-pass filters, Tests, Performance (Engineering), Attenuation, Frequency shift.

This report covers the work performed on the design and construction of SSB and VHF crystal filters in the frequency range of 2 to 30 MC during the fifth quarter. An equimotional all-pole ten-crystal narrowband filter at 10.5 MC has been designed and tested. Test results and an evaluation are presented. An equimotional ten-pole ten-zero ten-crystal narrow band filter at 10.5 MC has been designed and exactly analyzed under lossy and lossless conditions. The theory, design procedure and schematic diagram are presented. A bimotional ten-pole ten-zero ten-crystal narrow band filter at 10.5 MC has been designed and exactly analyzed under lossy and lossless conditions. The theory, design procedure, and numerical design calculations are presented. A bimotional ten-pole ten-zero ten-crystal narrow band ladder filter at 20.0 MC has been designed. Various 'normalized' lossless and lossy ladder filter designs have been exactly analyzed and evaluated. At present the ladder filter with single-crystal terminal half-sections appears to be the most feasible design. The first experimental design of the 30 MC third overtone crystal filter has been constructed, tested, and evaluated. Test results are presented and deficiencies and problems with their potential solutions are discussed. (Author)

AD-458 397 **Field 9E, 17B**
CFSTI Price: HC$1.60
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
REDUCTION OF SHIPBOARD RADIO INTERFERENCE.
Status rept.
23 Feb 65, 14p Rept. no. 1522-10
Contract N123 (953)31663A
Study program related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Radio interference, Ships), Antenna radia tion patterns, Ship structural components, Radiofrequency interference, Reduction, Equations, Electromagnetic wave reflections, Medium frequency, High frequency.

A study was made of antennas in shipboard environments at frequencies of 2-30 mc. The disturbance of radiation patterns by superstructure and other obstacles, and the reduction of mutual coupling between antennas represent the two main problems for study. The first problem, that of pattern disturbance caused by superstructure, has been approached by approximating the radiating source by an infinitely long line source, and the offending structure (of arbitrary shape) by an array of thin infinitely long wires outlining its surface. Such a cylindrical configuration approximates many practical shipboard situations and provides some basis for the location of antennas aboard ship. The second problem, that of radiation interference in the close confines of a ship, was approached via the characteristic mode concept. Very briefly, this approach presumes that the radiation patterns of antennas located on a hull (at the low frequencies under discussion) are a sum of simpler patterns which are characterized by the hull shape alone. It was felt that the delineation of these patterns, or modes, could aid the decoupling problem if they were found to be orthogonal. They also could be used as a tool in aperture synthesis techniques and array design.

AD-458 399 **Field 9E, 17B**
CFSTI Prices: HC$1.00
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
RADIATION PATTERNS OF ELECTRIC DIPOLES IN THE PRESENCE OF A CONDUCTING CYLINDER,
by L. J. Du and C. T. Tai. 31 Jan 65, 24p Rept. no. 1522-9
Contract N123 (953)31663A
Study program related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Dipole antennas, Shipborne), (*Antenna radiation patterns, Ship antennas), Green's function, Cylindrical bodies, Electrical conductance, Electro magnetic fields, Vector analysis, Special functions (Mathematics), Mathematical analysis, Numerical analysis.

Contents: The Dyadic Green's Function pertaining to exterior problems of a perfectly conducting cyclinder; Far-zone field of an arbitrarily oriented dipole in the presence of a cylinder; and Numerical computation.

AD-458 800 **Field 9A, 9E, 5E**
CFSTI Price: HC$2.60
CBS Labs., Stamford, Conn.
MICROPHONE, HEAD CONTACT M-123.
Quarterly progress rept. no. 3, 1 Sep - 30 Nov 64, by Allan J. Rosenheck and Alfred L. DiMattia. 31 Dec 64, 27p
Contract DA-28-043-AMC-00010 (E),
Proj. DA-1G6-41209-D-534

Descriptors: (*Microphones, Head), Tests, Earphones, Transducers, Resonance, Speech recognition, Vibration, Signal-to-noise ratio, Human engineering, Skin, Psychoacoustics, Pressure, Noise.

This report describes work performed during the quarterly period beginning September 1, 1964, and ending November 30, 1964, toward development of a practical head contact microphone. Contact location research was expanded to include all head regions of interest to this program. To insure generality, measurements were taken with ten talkers at various head locations. Spectral analysis and listening tests were performed, and results are described herein. A statistical analysis of level differences as a function of location and talker is given. Experiments were performed with the aim of design of a practical transducer. These included measurements of noise cancellation properties and mechanical impedance requirements. (Author)

AD-463 370 **Field 9E, 17B**
CFSTI Price: HC$3.00
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
PATTERN HANDBOOK. VOLUME I. FAR-FIELD PATTERN PREDICTION FOR SHIPBOARD ANTENNAS,
by Gray A. Thiele. 31 Mar 65, 51p Rept. no. 1522-11
Contract N123 (953)31663A
Study program related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Handbooks, Antenna radiation patterns), (*Antenna radiation patterns, Ship antennas), Scattering, Ship structural components, Electromagnetic wave reflections, Numerical analysis, Cylindrical bodies, Theory, High frequency, Medium frequency, Mathe matical prediction, Programming (Computers), Electric wire, Equations.

Identifiers: Whip antennas, FORTRAN, SCATRAN.

Shipboard antennas operate in the vicinity of the ship's superstructure which consists of numerous metallic scatterers of various sizes and shapes. The far-field patterns of shipboard antennas are perturbed by these scatterers and are therefore difficult to predict. In this report a method is discussed for approximating the far-field pattern in the horizontal plane of a thin vertical antenna (e.g., a whip antenna) near cylindrical scatterers of arbitrary cross-section whose physical heights are at least that of the antenna. The method is based on approximating the antenna with an infinite line source and the scatterer with an array of thin infinite wires. Some representative calculated and experimental results are presented which generally show very good agreement between the predicted and measured patterns. In addition, limitations of the method are discussed and the computer programs for calculating the far-field patterns are explained in some detail. (Author)

AD-464 812 **Field 9A, 20L**
CFSTI Price: HC$1.00
Michigan Univ., Ann Arbor. Infrared and Optical Sensor Lab.
HALL MEASUREMENTS OF THIN LAYERS OF SEMICONDUCTORS (U),
by Alfred E. Attard. Jun 65, 25p Rept. no. 6400-38-R
Contract DA-28-043-AMC-00013 (E),
Proj. DA-1P6-20801-A-186
Memorandum of Proj. Michigan.

Descriptors: (*Semiconducting films, Hall effect), (*Hall effect, Semiconducting films), Epitaxial growth, Diffusion, Resistance (Electrical), Test methods, Probes (Electromagnetic), Mathematical analysis, Equations, Voltage, Gallium alloys, Arsenic alloys, Surface properties, Semiconductors.

Identifiers: Michigan project.

Hall measurements on thin films via a four-point probe method are described. Basic formulas are derived for an infinite sheet. Modifications of the infinite-sheet formula to correct for boundary conditions imposed by real, finite samples are discussed. Experimental evidence is presented which verifies the theory. (Author)

AD-467 543 **Field 9E, 17B**
CFSTI Prices: HC$3.60 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
THE GAIN OF UNIFORM ARRAYS OF ISOTROPIC SOURCES AND DIPOLES,
by C. T. Tai. 31 Mar 63, 31p Rept. no. 1522-2
Contract N123 (953)31663A
Study program related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Gain, Ship antennas), (*Dipole antennas, Gain), Equations, Antenna arrays, Mathematical analysis.

This work consists of a compilation of formulae and curves for the gain of several types of uniform arrays formed by isotropic sources and short dipoles. (Author)

AD-467 888 **Field 9E, 17B**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
PATTERN HANDBOOK. VOLUME II. MEMORANDUM ON SHIPBOARD ANTENNA FAR-FIELD PATTERN PREDICTION,
by G. A. Thiele. 1 Jul 65, 25p Rept. no. 1522-12
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Antenna radiation patterns, Ship antennas), (*Handbooks, Antenna radiation pattern), Theory, Mathematical prediction, Cylindrical bodies, Electrical conductance, Scattering, Measurement.

Previous work on this contract produced a method for predicting the far-field pattern in the horizontal plane of a thin vertical antenna in the presence of conducting cylinders of arbitrary cross-section. However, this technique appeared to be valid only if the scatterer was taller than the antenna. This memorandum discusses an extensive set of measurements that show the influence of the scatterer to antenna height ratio on the far-field pattern, and also how the actual antenna height itself influences what this ratio should be. Thus, the limits of validity for representing finite height configurations with infinitely tall ones are now more closely defined. (Author)

AD-467 893 **Field 9E, 17B**
CFSTI Prices: HC$5.00 MF$1.00
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
PATTERN HANDBOOK. VOLUME III. FAR-FIELD PATTERNS OF A LINEAR ANTENNA RADIATING IN THE PRESENCE OF SQUARE CYLINDERS,
by C. H. Brenner. 1 Aug 65, 157p Rept. no. 1522-13
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Antenna radiation patterns, Ship antennas), (*Handbooks, Antenna radiation patterns), (*Dipole antennas, Antenna radiation patterns), Ship structural components, Mathematical prediction, Cylindrical bodies, Electrical conductance, Antenna configurations, Medium frequency, High frequency.

The prediction of fields radiated by shipboard antennas is complicated by the presence of parasitically excited superstructure which warps and deteriorates the far-field patterns. If antennas are to be located in some logical manner on the ship, or if the ship design itself is to take account of the primary radiating elements, then some guides must be found to account for the influence of superstructure on antenna patterns. To this end, a handbook has been compiled, giving patterns of a thin, linear, vertical antenna radiating in the presence of cylindrical conducting structures of various cross-sectional shape. The model used to approximate this configuration is that of an infinite line source, representing the dipole, radiating in the presence of an array of thin, infinite wires parallel to each other and outlining the surface of the offending cylindrical structure. It has been shown that such a wire approximation is electrically similar to the solid metallic surface if at least 5 wires per wavelength

of perimeter are used. It has also been shown that the patterns obtained from the infinitely tall model in the plane normal to the cylinder axis are good approximations to those obtained from the actual finite height configuration so long as the offending structure is taller than the source antenna, preferably twice as tall.

AD-469 175 **Field 9E, 17B**
CFSTI Prices: HC$1.60 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
REDUCTION OF SHIPBOARD RADIO INTERFERENCE.
Status rept., 8 Feb-9 Aug 65.
9 Aug 65, 14p Rept. no. 1522-17
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio interference), (*Radio interference, Ship antennas), (*Antenna radia tion patterns, Ship structural components), Radio com munication systems, High frequency, Medium frequency, Reduction, Electromagnetic wave reflections, Electro magnetic waves, Cylindrical bodies, Radiofrequency interference.

Efforts concern the investigation of antennas in shipboard environments at frequencies of 2-30 Mc. The disturbance of radiation patterns by superstructure and other obstacles, and the reduction of mutual coupling between antennas represent the two main problems for study.

AD-470 818 **Field 9E, 17B**
CFSTI Prices: HC$5.00 MF$1.00
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
PATTERN HANDBOOK. VOLUME V. FAR FIELD PATTERNS OF A LINEAR ANTENNA RADIATING IN THE PRESENCE OF ELLIPTICAL CYLINDERS,
by C. H. Brenner. 1 Aug 65, 169p Rept. no. 1522-15
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Handbooks, Antenna radiation patterns), (*Antenna radiation patterns, Ship antennas), (*Dipole antennas, Ship antennas), Ship structural components, Cylindrical bodies, Antenna configurations, Electro magnetic wave reflections, Programming (Computers), Electric wire, High frequency, Medium frequency, Ellipsoids.

Identifiers: SCATRAN.

The prediction of fields radiated by shipboard antennas is complicated by the presence of parasitically excited superstructure which warps and deteriorates the far-field patterns. If antennas are to be located in some logical manner on the ship, or if the ship design itself is to take account of the primary radiating elements, then some guides must be found to account for the influence of superstructure on antenna patterns. To this end, a handbook has been compiled, giving patterns of a thin, linear, vertical antenna radiating in the presence of cylindrical conducting structures of various cross-sectional shape. The model used to approximate this configuration is that of an infinite line source, representing the dipole, radiating in the presence of an array of thin, infinite wires parallel to each other and outlining the surface of the offending cylindrical structure. It has been shown that such a wire approximation is electrically similar to the solid metallic surface if at least 5 wires per wavelength of perimeter are used. It has also been shown that the patterns obtained from the infinitely tall model in the plane normal to the cylinder axis are good approximations to those obtained from the actual finite height configuration so long as the offending structure is taller than the source antenna, preferably twice as tall.

AD-470 819 **Field 9E, 17B**
CFSTI Prices: HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
PATTERN HANDBOOK. VOLUME VI. FAR-FIELD PATTERNS OF A LINEAR ANTENNA RADIATING IN THE PRESENCE OF CIRCULAR CYLINDERS,
by C. H. Brenner. 1 Aug 65, 62p Rept. no. 1522-16
Contract N123 (953)31663A
Study Program Related to Shipboard Antenna System Environment.

Descriptors: (*Ship antennas, Radio communication systems), (*Handbooks, Antenna radiation patterns), (*Antenna radiation patterns, Ship antennas), (*Dipole antennas, Ship antennas), Cylindrical bodies, Ship structural components, Electromagnetic wave reflections, Programming (Computers), Antenna configurations, High frequency, Medium frequency, Electric wire.

Identifiers: SCATRAN.

The prediction of fields radiated by shipboard antennas is complicated by the presence of parasitically excited superstructure which warps and deteriorates the far-field patterns. If antennas are to be located in some logical manner on the ship, or if the ship design itself is to take account of the primary radiating elements, then some guides must be found to account for the influence of superstructure on antenna patterns. To this end, a handbook has been compiled, giving patterns of a thin, linear, vertical antenna radiating in the presence of cylindrical conducting structures of various cross-sectional shape. The model used to approximate this configuration is that of an infinite line source, representing the dipole, radiating in the presence of an array of thin, infinite wires parallel to each other and outlining the surface of the offending cylindrical structure. It has been shown that such a wire approximation is electrically similar to the solid metallic surface if at least 5 wires per wavelength of perimeter are used. It has also been shown that the patterns obtained from the infinitely tall model in the plane normal to the cylinder axis are good approximations to those obtained from the actual finite height configuration so long as the offending structure is taller than the source antenna, preferably twice as tall.

AD-475 434 **Field 9E**
CFSTI Prices: HC$3.60 MF$0.50
Michigan Univ., Ann Arbor. Willow Run Labs.
A BROADBAND THEORY FOR LINEAR ARRAYS,
by C. Bruce Sharpe and Robert B. Crane. Dec 65, 31p Rept. no. 6400-49-T
Contract DA-28-043-AMC-00013 (E).
Proj. 1P6-20801-A-175
Rept. on Proj. MICHIGAN.

Descriptors: (*Antenna arrays, Broadband), Theory, Antenna radiation patterns, Gain, Bandwith, Distortion, Antenna lobes, Reduction, Radar antennas, Mathematical analysis.

Identifiers: Michigan project.

The effect of broadband signals on the far-zone field of long arrays is investigated in terms of the energy radiation pattern. A generalized directive gain is introduced which depends on the signal spectrum. With maximum directivity as a criterion it is shown that the problem of optimizing a long isotropic array with respect to a given signal can be associated with a classical eigenvalue problem. The concept of array bandwidth is introduced. Computed curves for directivity, directive gain, and signal distortion are given in terms of this parameter and signal bandwidth. It is shown that while little improvement in directivity is achieved by optimizing the distribution coefficients of an array, a substantial reduction in sidelobe level is obtained. (Author)

N66-12501 **Field 9C**
CFSTI Prices: HC$1.00 MF$0.50
Georgia Inst. of Tech., Atlanta.
THIN-FILM RC LINES WITH RESEMBLING OPEN-CIRCUIT CHARACTERISTICS,
by K. L. Su. 1965, 8p
Grant NGR-11-002-020
NASA CR-68290

Descriptors: *Capacitance, *Line shape, *Thin film, *Resistance, *Transmission line.

N66-14293 **Field 9F**
CFSTI Prices: HC$1.00 MF$0.50
New York Univ., N. Y. Lab. for Electroscience Research.
DISCUSSION OF TELEMETRY PERFORMANCE STANDARDS.
Technical memo. no. 40,
by L. S. Schwartz. Jun 64, 14p
Contract NAS5-3508
NASA CR-68979

Descriptors: *Probability, *Performance character istics, *Telemetry.

N66-14299 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
General Dynamics/Convair, San Diego, Calif.
PHASE 1, SIMULATION OF SELECTED DISCRETE NETWORKS. VOLUME ONE. THE LOGIC MODEL.
Final rept.
Sep 65, 41p GD/C-DDF-65-005
Contract NAS8-20016
NASA CR-68972

Descriptors: *Simulation, *Boolean algebra, *Dis crete function.

N66-17104 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF THE RELIABILITY OF ELECTRONIC COMPONENTS IN A NUCLEAR-RADIATION ENVIRONMENT.
Quarterly rept. no. 11, 1 Jul - 30 Sep 65,
by D. J. Hamman and C. L. Hanks. 15 Oct 64, 14p
Contract NAS7-100
NASA CR-68841

Descriptors: *Capacitor, *Environmental testing, *Diode, *Nuclear radiation, *Rectifier, *Transistor.

N66-17108 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
CBS Labs., Stamford, Conn.
ONE YEAR LIFE TEST OF 1-1/2 INCH IMAGE DISSECTOR.
Final rept.,
by J. Z. Karpinski. 13 Dec 65, 19p
Contract NAS7-100
NASA CR-70334

Descriptors: *Lifetime, *Image dissector tube, *Performance characteristics, *Simulation.

N66-17110 **Field 9A**
CFSTI Prices: HC$3.00 MF$0.75
CBS Labs., Stamford, Conn.
SHORT WIDE ANGLE, 1-1/2 INCH ELECTROSTATIC IMAGE DISSECTOR WITH PARALLEL PLATE RESISTIVE STRIP ELECTRONIC MULTIPLIER.
Final rept. 22 Feb 63-1 Nov 65,
by J. Z. Karpinski. 1 Dec 65, 73p
Contract NAS7-100
NASA CR-70336

Descriptors: *Electron optics, *Electrostatic instrument, *Image dissector tube.

N66-17223 Field 9C
CFSTI Prices: HC$1.00 MF$0.50
Brown Univ., Providence, R. I.
ON THE EXISTENCE OF LIAPUNOV FUNCTIONS FOR THE PROBLEM OF LURIE,
by K. R. Meyer. 1964, 25p
Grants NGR-40-002-015, AF-AFOSR-693-64
NASA CR-60170
Prepared in cooperation with Dept. of the Army Contract DA-31-124-ARO (D)-270.

Descriptors: *Control system, *Liapunov function, *Matrix analysis.

N66-17224 Field 9C
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I.
ON STABILITY IN CONTROL SYSTEMS,
by E. Roxin. 1964, 30p
Grants NGR-40-002-015, AF-AFOSR-693-64
NASA CR-60377

Descriptors: *Dynamics, *Stability, *Control system.

NBS-Handbook 101 Field 9B, 12A
CFSTI Prices: HC$3.00 MF$1.25
National Bureau of Standards, Washington, D. C.
OMNITAB. A COMPUTER PROGRAM FOR STATISTICAL AND NUMERICAL ANALYSIS,
by Joseph Hilsenrath, Guy G. Ziegler, Carla G.Messina, Philip J. Walsh, and Robert J. Herbold. 4 Mar 66, 267p
Available from Superintendent of Documents, GPO, Washington, D. C. HC $3.00, as C-13.11:44.

Descriptors: (*Programming (Computers), Numerical analysis), (*Numerical analysis, Programming (Computers)), (*Statistical analysis, Programming (Computers)), Instruction manuals.

Identifiers: IBM 7090/7094.

OMNITAB is a completely assembled interpretive program for the IBM 7090/7094 which permits direct use of the machine by scientists or engineers without knowledge of programming. Instructions, given in the form of English sentences, control the flow of calculations in a manner highly analogous to the logic which prevails in carrying out computations on a desk calculator. OMNITAB simulates desk computing in that it replaces the desk calculator, mathematical tables, and the multicolumn work sheet. The name of the program has the following sigificance. It is one in a series of omnibus programs, hence the omni. It is able to handle a wide variety of tabular numerical operations, hence the tab. It has a versatile function generating capacity and can handle functions of two or more variables.

NBS-TN-282 Field 9B
CFSTI Prices: HC$0.25 MF$0.50
Bureau of the Census, Suitland, Md. Engineering Development Branch.
KEYPUNCH CONTROLS FOR STRING-PUNCHING OF STATISTICAL DATA.
Technical note,
by Martin J. Brennan. 11 Feb 66, 34p
Available from Superintendent of Documents, GPO, Washington, D. C. 20402, HC $0.25, as CB.46:282.

Descriptors: (*Punched cards, Control systems).

Identifiers: Key-punching, Keypunch machines.

The note describes controls for a keypunch machine used to key statistical data with 'string-punching techniques'. Since the data are punched into cards that do not contain fixed field sizes, an identification code is punched for each data entry. To avoid a split field (part on one card and the remainder on another), the keypunch machine is programmed to provide a justification zone in which an answer identification code of a 'delete' code can not be keyed. The cards are automatically serialized for each questionnaire and an arrangement is provided to punch an end-of-questionnaire code in the last card for the questionnaire. (Author)

NBS-TN-331 Field 9E, 14B
CFSTI Prices: MF$0.50
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
A 100 KW 2-25 Mc/s DISTRIBUTED AMPLIFIER, DESIGNED FOR USE WITH 10 KW IONOSPHERIC SOUNDERS.
Technical note,
by W. B. Harding, M. W. Woodward, and J. C. Carroll. 15 Feb 66, 24p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.20 as C13.36:331.

Descriptors: (*Distributed amplifiers, Probes (Elec tromagnetic)), (*Atmospheric sounding, Probes (Elec tromagnetic)), Ionosphere, Backscattering.

The paper describes the design, construction, and testing of an r-f distributed amplifier intended for ionospheric sounding and backscatter applications. The amplifier has a power gain of 10 dB and a rated output of 100 kW peak pulse power, over a range of 2 to 25 Mc/s. A feature of this amplifier is the elimination of input and output transformers. The distributed amplifier was designed to be driven by the C-3 ionospheric sounder. The C-3 equipment has a nominal peak pulse power capability of 10 kW and a sweep frequency range of 1 to 25 Mc/s. Consideration was given to the desire to extend the frequency range of the present equipment to 60 Mc/s, and a cut-off frequency of 70 Mc/s was inserted into the design requirements for the subject amplifier. Seventy Mc/s was used in order to maintain as much output as possible thru 60 Mc/s; however, lack of a suitable driving power source has prevented testing above 25 Mc/s.

10. ENERGY CONVERSION (NON-PROPULSIVE)

N66-12169 Field 10C
CFSTI Prices: HC$3.00 MF$0.50
Monsanto Research Corp., Everett, Mass. Boston Lab.
RESEARCH AND DEVELOPMENT OF THE DRY TAPE BATTERY CONCEPT.
Quarterly report no. 1, 9 Jun. - 8 Sep. 65,
by L. F. Athearn, J. J. Byrne, J. C. Mac Donald and D. L. Williams. 8 Oct 65, 51p MRB5010Q1
Contract NAS3-7624
NASA CR-54782

Descriptors: *Anode, *Battery, *Electrolyte, *Tape, *Cathode, *Discharge.

N66-14273 Field 10A
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Schenectady, N. Y. Research and Development Center.
STUDY OF NICKEL-CADMIUM CELLS.
Quarterly rept. no. 1, 17 May - 17 Aug 65. 1965, 26p
Contract NAS5-9586
NASA CR-68995

Descriptors: *Monitor, *Nickel-cadmium battery, *Storage battery, *Electrode, *Oxygen.

N66-14279 Field 10A
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co. , Sunnyvale, Calif.
STUDY OF DRIFT-FIELD SOLAR CELLS DAMAGED BY LOW-ENERGY PROTONS.
Monthly rept. 15 Oct-19 Nov 65,
by D. L. Crowther and J. De Pangher. 1965, 28p
Contract NAS5-9627
NASA CR-68993

Descriptors: *Drift, *Proton damage, *Solar cell.

N66-14282 Field 10A
CFSTI Prices: HC$1.00 MF$0.50
Harshaw Chemical Co., Cleveland, Ohio. Crystal-Solid State Div.
CADMIUM SULFIDE PHOTOCONDUCTOR CELLS.
Final rept., Sep 64-Sep 65,
by E. Hill. 1965, 11p
Contract NAS5-5884
NASA CR-68990

Descriptors: *Photoconductive cell, *Cadmium sul fide, *Deposition.

N66-14284 Field 10A
CFSTI Prices: HC$5.00 MF$1.00
Naval Ammunition Depot, Crane, Ind.
LIFE CYCLE TESTS.
Monthly progress rept. for 30 Sep 65. 1965, 152p
Contract NASA Order W-11252-B
NASA CR-68986

Descriptors: *Nickel-cadmium battery, *Silver-zinc battery, *Test program, *Silver-cadmium battery.

N66-14288 Field 10A
CFSTI Prices: HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
SMALL FUEL CELL TO ELIMINATE PRESSURE CAUSED BY GASSING IN HIGH ENERGY DENSITY BATTERIES.
Progress rept., 30 Jun-30 Sep 65,
by H. Frank and M. P. Strier. Sep 65, 31p SM-48457-Q1
Contract NAS5-9594
NASA CR-68985

Descriptors: *Gas, *Silver-zinc battery, *Fuel cell, *Pressure effect.

N66-14763 Field 10B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Cleveland, Ohio. Lewis Research Center.
ALTERNATE APPROACHES TO STERILIZABLE POWER SOURCES,
by D. G. Soltis. 1965, 13p
NASA TM-X-52137
Presented at the Natl. Conf. on Spacecraft Sterilization Technol., sponsored by Nasa, Pasadena, Calif., 16-18 Nov 2 95%.

Descriptors: *Sterilization, *Regenerative fuel cell, *Silver-zinc battery.

N66-14766 Field 10A
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Cleveland, Ohio. Lewis Research Center.
SOME PROBLEMS OF THE THIN FILM CADMIUM SULFIDE SOLAR CELL,

by A. E. Potter, A. E. Spakowski, and R. L. Schalla. 1965, 17p
NASA TM-X-52144
Presented at the Photovoltaic Specialists Conf. (5th), Washington, d. c., 18-20 Oct 1965.

Descriptors: *Storage, *Cadmium sulfide, *Humidity, *Solar cell, *Thermal cycling.

N66-14769 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FUEL CELLS,
by H. J. Schwartz. 1965, 22p
NASA TM-X-52149
Presented at the Aiche Natl. Meeting, (58th) Philadelphia, 5-9 Dec 1965.

Descriptors: *Fuel cell, *Oxygen system, *Spacecraft power supply, *Hydrogen fuel.

N66-14775 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SURVEY OF ELECTRIC POWER PLANTS FOR SPACE APPLICATIONS,
by H. J. Schwartz and L. I. Shure. 1965, 39p
NASA TM-X-52158
Presented at The Aiche Natl. Meeting, (58th), Philadelphia, 5-9 Dec 1965.

Descriptors: *Fuel cell, *Spacecraft power supply, *Brayton cycle, *Rankine cycle, *Thermionic converter.

N66-15227 **Field 10A**
CFSTI Prices: HC$5.00 MF$1.00
Douglas Aircraft Co., Inc., Newport Beach, Calif. Astropower Lab.
INORGANIC ION EXCHANGE MEMBRANES FUEL CELL.
Final rept.,
by C. B. Berger and M. P. Strier. Oct 65, 177p
SM-46221-F
Contract NAS3-6000
NASA CR-54784

Descriptors: *Zirconium compound, *Fuel cell, *Ion exchange membrane.

N66-15307 **Field 10A**
CFSTI Prices: HC$3.00 MF$0.50
Unified Science Associates, Inc., Pasadena, Calif.
GASEOUS ELECTROLYTES FOR BATTERIES AND FUEL CELLS.
Fourth Quarterly rept. no. 4, 21 May - 20 Aug 65,
by S. Naiditch. 1965, 51p
Contract NAS7-326
NASA CR-69248

Descriptors: *Battery, *Electrolyte, *Fuel cell.

N66-15486 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
WEIGHT STUDY OF PARTIALLY SEGMENTED DIRECT-CONDENSING RADIATORS FOR LARGE SPACE POWER SYSTEMS,
by R. L. Johnsen. Jan. 66, 51p, NASA-TN-D-3227

Descriptors: *Condenser radiator, *Weight, *Power supply.

11. MATERIALS

AD-287 788 **Field 11F**
CFSTI Prices: HC$13.60
Virginia Inst. for Scientific Research, Richmond.
THE ACCELERATED CORROSION OF METALS.
Final rept., 15 Sep 59-15 Sep 62,
by Henry Leidheiser, Jr. 30 Oct 62, 135p
Contracts DA-18-108-405-CML-518, DA-18-108-CML-7008

Descriptors: (*Corrosion, Metals) , (*Liquid metals, Corrosive liquids), (*Metals, Corrosion), Mercury alloys, Oxidation, Aluminum, Iron, Copper, Gallium, Gallium alloys, Indium alloys, Zinc, Silver, Cadmium, Lead, T Mercury compounds, Iodides, Salts, Water vapor.

Two outstanding examples of the deterioration of metals in contact with liquid metals and alloys at room temperature were observed in this study: (1) the rapid oxidation of aluminum and magnesium in the presence of mercury and its alloys, and (2) the cracking and loss of internal cohesion of such metals as aluminum, zinc, silver, cadmium, lead, and tin in the presence of gallium and its alloys. The most effective liquid metal alloy in the attack on aluminum was the 80% Hg-20% Tl alloy. The most effective liquid metal alloy in the attack on magnesium was the 95% Hg-5% In alloy. (Author)

N66-10525 **Field 11B**
CFSTI Prices: HC$4.00 MF$1.00
Technische Hogeschool, Eindhoven (Netherlands).
THE MECHANICAL STRENGTH OF ALKALI-ALUMINO-SILICATE GLASSES AFTER ION EXCHANGE.
Doctoral thesis,
by A. J. Burggraaf. 1965, 121p

Descriptors: *Sodium silicate, *Alkali, *Aluminum silicate, *Ion exchange.

N66-11794 **Field 11I, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Institut Franco-Allemand De Recherches, St. Louis (France).
SHOCK HUGONIOTS OF PERSPEX, POLYETHYLENE, MAGNESIUM AND GLASS, DETERMINED BY FLASH RADIOGRAPHY,
by R. Schall and G. Tromer. 12 Jul 63, 30p ISL-5-63
Grant AF-EOAR-61-52

Descriptors: *Perspex, *Polyethylene, *Compressibility, *Glass, *Magnesium, *Radiography, *Shock load.

N66-12199 **Field 11A**
CFSTI Prices: HC$2.00 MF$0.50
Tennessee Univ., Knoxville. Dept of Mechanical and Aerospace Engineering.
THEORETICAL AND EXPERIMENTAL STUDIES OF VISCO-TYPE SHAFT SEALS.
Semiannual progress report, 15 Oct 64 - 15 Apr 65,
by W. K. Stair. 21 May 65. 27p ME-65-587-3
Grant NG-587
NASA CR-68220

Descriptors: *Sealant, *Viscoelastic flow, *Shaft.

N66-13673 **Field 11A**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy of Canada Ltd., Chalk River, Ontario.
HIGH PRESSURE ROTARY FACE-TYPE SHAFT SEALS FOR WATER APPLICATIONS,
by R. D. Watson. Dec 64, 25p AECL-2249

Descriptors: *Hydrostatic pressure, *Pump seal, *Quality control, *Reliability.

N66-13945 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Laboratoires du Centre d Etude De l Energie Nucleaire, Mol (Belgium).
IMPERFECTIONS IN METALS. II. CORROSION AND OXIDATION.
Quarterly rept. no. 7, 1 Apr-30 Jun 64. 1964, 18p Rept. no. R-2314
Contract EURATOM-082-62-7 ROB
EURAEC 1223

Descriptors: *Diffraction, *Electron microscopy, *Oxide film, *Titanium.

N66-14064 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
DETERMINATION OF THE WELDABILITY AND ELEVATED TEMPERATURE STABILITY OF REFRACTORY METAL ALLOYS.
Quarterly report no. 8, 21 Mar - 20 Jun 65,
by G. G. Lessmann and D. R. Stoner. 1965, 91p
WANL-PR (P)-008
Contract NAS3-2540
NASA CR-54723

Descriptors: *Refractory metal, *Refractory alloy, *Welded structure.

N66-15230 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SELECTED MECHANICAL AND PHYSICAL PROPER- TIES OF BORON FILAMENTS,
by H. W. Herring. Jan 66, 45p NASA-TN-D-3202

Descriptors: *Boron, *Filament, *Metallography, *Physical property.

N66-15485 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ULTRAHIGH-VACUUM CREEP BEHAVIOR OF COLUMBIUM AND TANTALUM ALLOYS AT 2000 DEG AND 2200 DEG F FOR TIMES GREATER THAN 1000 HOURS,
by R. W. Hall and R. H. Titran. Jan 66, 27p
NASA-TN-D-3222

Descriptors: *Creep, *Niobium alloy, *Tantalum alloy, *Ultrahigh vacuum.

N66-15489 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MECHANICAL PROPERTIES AND RECRYSTALLIZATION BEHAVIOR OF ELECTRON-BEAM-MELTED TUNGSTEN COMPARED WITH ARC-MELTED TUNGSTEN,
by W. D. Klopp and W. R. Witzke. Jan 66, 36p
NASA-TN-D-3232

Descriptors: *Mechanical property, *Recrystallization, *Tungsten, *Arc melting, *Electron beam, *Melting.

N66-15491 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FRICTION, WEAR, AND ADHESION CHARACTERISTICS OF TITANIUM-ALUMINUM ALLOYS IN VACUUM,

by D. H. Buckley and R. L. Johnson. Jan 66, 18p NASA-TN-D-3235

Descriptors: *Adhesion, *Friction, *Titanium alloy, *Wear, *Aluminum alloy.

N66-15492 Field 11F
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INFLUENCE OF ORIENTATION OF GRAINS IN TUNGSTEN ON ITS FRICTION CHARACTERISTICS,
by D. H. Buckley. Jan 66, 23p NASA-TN-D-3238

Descriptors: *Friction, *Grain, *Tungsten.

N66-17087 Field 11D
CFSTI Prices: HC$2.00 MF$0.50
IIT Research Inst., Chicago, Ill.
GRAPHITE-METAL COMPOSITES.
Quarterly rept. no. 2,
by Y. Harada and G. A. Rubin. 21 Jan 66, 32p IITRI-G6003-2
Contract NASR-65 (09)
NASA CR-70320

Descriptors: *Alloy, *Carbon, *Composite material, *Graphite, *Molybdenum carbide.

PB-169 218 Field 11F, 18J, 20K
CFSTI Prices: HC$1.00 MF$0.50
Kjeller Research Establishment (Norway). Institutt for Atomenergi.
HIGH TEMPERATURE LOW CYCLE FATIGUE OF AN EXTRUDED ALUMINIUM, SILICON, MAGNESIUM, NICKEL ALLOY,
by V. de L. Davies and K. Bakken. Oct 65, 13p KR-99

Descriptors: (*Aluminum alloys, Fatigue (Mechanics)), (*Corrosion-resistant alloys, Fatigue (Mechanics)), Silicon alloys, Magnesium alloys, Nickel alloys, Strain (Mechanics), Plasticity, Stresses, Loading (Mechanics), Thermal properties, Modulus of Elasticity, Tensile properties, Reactor materials, Norway.

Identifiers: Aluminum alloy IFA-3.

The strain fatigue properties of the IFA-3 aluminium alloy (12 w/o Si, 0.8 w/o Mg, 1 w/o Ni, bal. Al) were investigated at 250, 300 and 350C. The results when plotted as log plastic strain range versus log number of cycles to failure, show good agreement with the general results reported in the literature. From the present data it may also be concluded that, in the frequency and temperature range investigated, there is no correlation between frequency and number of cycles to failure for this particular aluminium alloy. This means that for a given plastic strain amplitude (or range) there is a definite number of cycles to failure which, within scatter, is independent of frequency and temperature. The stress, however, is both frequency and temperature dependent. (Author)

PB-169 448 Field 11I, 7D
CFSTI Prices: HC$3.00 MF$0.75
Royal Aircraft Establishment, Farnborough (England).
GLASS TRANSITION TEMPERATURES OF HOMOPOLYMERS: A BIBLIOGRAPHY AND ASSESSMENT OF AVAILABLE DATA,
by W. A. Lee. Jul 65, 77p Technical rept. no. TR-65151

Descriptors: (*Polymers, Transition temperature), (*Plastics, Transition temperature), (*Transition temperature, Polymers), Phase studies, Glass, Measurement, Impurities, Acrylic resins, Polyamide plastics, Styrene plastics, Dienes, Polyester plastics, Anhydrides, Epoxy plastics, Silicone plastics, Cellulosic plastics, Reviews, Bibliographies, Great Britain.

The glass temperature (T-G) of polymers is defined and methods for its determination are enumerated. The influence of rate of measurement, purity and condition of sample on observed T-G's and the interpretation of data and criteria for their assessment are discussed. G T-G's of 424 homopolymers are tabulated with a comprehensive bibliography of 353 references up to November 1964. (Author)

PB-169 456 Field 11I, 7C
CFSTI Prices: HC$3.00 MF$0.75
Royal Aircraft Establishment, Farnborough (England).
NOTES ON THE INTERNATIONAL SYMPOSIUM ON MACROMOLECULAR CHEMISTRY, PRAGUE, 30TH AUGUST-4TH SEPTEMBER, 1965,
by W. W. Wright. Oct 65, 86p Technical rept. no. TR-65233

Descriptors: (*Polymers, Symposia), Heat-resistant plastics, Carbon, Polymerization, Degradation, Fibers (Synthetic), Elastomers, Plastics, Electrical conductance, Adhesives, Friction, Abstracts, Bibliographies, Great Britain, Czechoslovakia.

The symposium was organised under the auspices of the International Union of Pure and Applied Chemistry and was devoted to papers on fundamental research in all branches of the field of macromolecular chemistry. Features of the conference of particular interest to the work of Chemistry, Physics and Metallurgy Department, Royal Aircraft Establishment, are briefly reviewed. (Author)

PB-169 524 Field 11F, 7B
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
DOSAGE SPECTROGRAPHIQUE DE PETITES QUAN- TITES DE BORE DANS LE FER ET LES ACIERS A L'AIDE DU SEPARATEUR D'ORDRES (Spectrographic Determination of Small Quantities of Boron in Iron and Steels by Means of Order Sorter),
by Danh Tran Van and Jacques Ernoult. Jan 66, 16p CEA-R-2914
Text in French; Attached Summary in English.

Descriptors: (*Boron, Spectroscopy), (*Iron, Micro analysis), (*Steel, Microanalysis), Spectrum analyzers, Emissivity, Continuous spectrum, France.

Small quantities of boron in iron and steels have been determined by means of a spectrographic method using an order sorter. Samples containing more than 5 ppm of boron can be analysed with standard deviation of about 10 per cent. (Author)

12. MATHEMATICAL SCIENCES

N66-10495 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
European Space Vehicle Launcher Development Organization, Paris (France).
COORDINATES AND EQUATIONS IN THE DISCUSSION OF PROBLEMS OF ATTITUDE,
by E. Cambi. Sep 65, 16p ELDO-TM-F-24

Descriptors: *Attitude, *Rotation, *Analytic geometry, *Coordinate system.

N66-11741 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Queens Univ., Kingston (Ontario). Dept. of Electrical Engineering.
THE AUTOCORRELATION FUNCTION OF THE OUTPUT OF A NONLINEAR ANGLE-MODULATOR,
by P. H. Wittke. Jan 63, 20p RR-63-1
Contract DRB-013011

Descriptors: *Correlation function, *Frequency modulation, *Nonlinearity, *Autocorrelation, *Oscillator.

N66-14912 Field 12B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
SIMULATION STUDY OF THE AMOUNT OF SENSITIVITY TEST DATA REQUIRED TO REJECT THE HYPOTHESIS OF NORMALITY WHEN THE SAMPLE POPULATION IS NON-NORMAL,
by J. B. Gayle and C. L. Hopkins. 4 Nov 65, 20p NASA TM-X-53357

Descriptors: *Normal distribution, *Computer simulation, *Probability distribution, *Sampled data, *Statistical probability.

N66-17070 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Northwestern Univ., Evanston, Ill.
ON SOME INEQUALITIES AND THEIR APPLICATION TO THE CAUCHY PROBLEM,
by A. Friedman. 1963, 14p
Grant NGR-14-007-021
NASA CR-70308

Descriptors: *Cauchy problem, *Problem solving.

N66-17074 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
R CHART CONTROL LIMITS BASED ON A SMALL NUMBER OF SUBGROUPS,
by F. S. Hillier. 4 Oct 65, 24p Rept. no. 83
Contract Nonr-225 (53)
NASA CR-70310

Descriptors: *Inspection, *Production engineering, *Quality control.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

AD-463 813 Field 13A, 21G
CFSTI Price: HC$1.60
Army Foreign Science and Technology Center, Washington, D. C.
A CATALYTIC HEATER AND HOW TO MAKE IT,
by V. Shikhov. May 65, 7p FSTC-381-T64-237
TT 66-60824
Trans. of Za Rulem (USSR) v22 n1 p16-7 1964.

Descriptors: (*Heaters, Catalysts), (*Catalysts, Heaters), Safety, Gasoline, Design, Operation, Asbestos, Cobalt compounds, Chromium compounds, Engine starters, Internal combustion engines, USSR.

The heater consists of a reservoir for the fuel and a catalytic burner. Both of these parts are mounted in a common welded body made of sheet iron of a thickness of 1 mm. The size of the heater is 240 x 400 x 185 mm. Wicks made of cord asbestos, the upper ends of which are flared, are lowered through a narrow crack into the reservoir. Two metal grids are placed in the heater on special fastening angles (10 x 10); between them is a uniform layer of fibrous asbestos impregnated with a catalyst. For the heater it is possible to use a cobalt-chromium catalyst containing 27.3% CoO, 72.1%

Cr203, and 0.6% Mn02. It is made from pure 'reagents' -- ammonium dichromate, manganese nitrate, cobalt nitrate, and concentrated ammonia.

N66-14061 **Field 13I**
CFSTI Prices: HC$3.00 MF$0.75
Pratt and Whitney Aircraft, East Hartford, Conn.
BRAYTON-CYCLE TURBOMACHINERY ROLLING-ELEMENT BEARING SYSTEM.
First Quarterly Report no. 1, 2 Jul. 2 Oct. 65,
by H. Means. Oct 63, 74p PWA-2713
Contract NAS3-7635
NASA CR-54785

Descriptors: *Brayton cycle, *Rolling, *Turbomachine, *Bearing.

N66-14277 **Field 13G**
CFSTI Prices: HC$4.00 MF$0.75
Boeing Co., Seattle, Wash.
DEVELOPMENT AND TESTING OF A LOW-TEMPERATURE HYDRAULIC SYSTEM VOLUME I - ACTUATION APPLICATIONS TRADE STUDY.
Final rept.
Sep 65, 103p D2-90795-1
Contract NAS8-11722
NASA CR-68368

Descriptors: *Aactuator, *Manned spacecraft, *Task.

N66-14278 **Field 13G**
CFSTI Prices: HC$4.00 MF$1.00
Boeing Co., Seattle, Wash. Aerospace Group.
DEVELOPMENT AND TESTING OF A LOW-TEMPERATURE HYDRAULIC SYSTEM) VOLUME II. HYDRAULIC SYSTEM ANALYSIS AND TEST PROGRAM.
Final rep
NASA CR-68983

Descriptors: *Environmental testing, *Space simulation, *Systems analysis, *Hydraulic actuator.

N66-14285 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.75
Boeing Co., Wichita, Kans. Airplane Div.
COMPOSITE BULKHEAD FABRICATION DEVELOPMENT.
Final rept.,
by R. F. Cox. Nov 65, 77p
Contract NAS8-11900
NASA CR-68984

Descriptors: *Autoclave process, *Bulkhead, *Com posite structure, *Sandwich construction, *Vacuum.

N66-14772 **Field 13A**
CFSTI Prices: HC$2.00 MF$0.50
N Lewis Research Center.
MATERIAL AND GEOMETRY ASPECTS OF SPACE RADIATORS,
by J. H. Diedrich and S. Lieblein. 1965, 28p
NASA TM-X-52153
Presented at the AM. Nucl. Soc. Winter Meeting, Washington, D. C., 15-18 Nov 1965.

Descriptors: *Space radiator, *Fin, *Geometry, *Material testing.

N66-15228 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.75
Hittman Associates, Inc., Baltimore, Md.
THERMOELECTRIC BONDING STUDY,
by A. L. Eiss. Jan 66, 62p
Contract NAS5-3973
NASA CR-369

Descriptors: *Bonding, *Lead telluride, *Failure mode, *Thermoelectric material.

N66-17111 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Frankford Arsenal, Philadelphia, Pa.
PROCESS DEVELOPMENT OF SHAPED MAGNESIUM -LITHIUM CASTINGS,
by R. E. Edelman and A. Saia. Nov 65, 28p R-1785
Contract NASA Order-H-71508
NASA CR-70337

Descriptors: *Casting, *Lithium alloy, *Magnesium alloy, *Silicon alloy.

PB-169 370 **Field 13B, 8H, 5K, 6F**
CFSTI Prices: HC$3.00 MF$0.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
THE SANTEE RECREATION PROJECT, SANTEE, CALIFORNIA.
Summary rept., 1962-1964,
by John C. Merrell, Jr., Albert Katko, andHerbert E. Pintler. Dec 65, 74p
PHS Pub-999-WP-27
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Lakes, Recreation), (*Recreation, California), Sewage, Purification, Processing, Bacteria, Viruses, Ecology, Epidemiology, Public opinion, Public health, Nutrition, Water supplies, Reclamation.

Identifiers: Santee recreation project.

The paper presents the results of a study of the Santee, California, recreational lakes. These lakes were deliberately planned to utilize the community's reclaimed sewage effluent. The seven-agency cooperative study evaluated the fate of virus along with total and fecal coliform and fecal streptococci through the conventional secondary treatment process, the tertiary processes, and the recreational lakes. The correlating physical and chemical data were also presented along with a bio-logical study of the lakes and related land area. Discussions of eutrophication, vector control, epidemiology, and the social acceptance and ecology of the entire recreational park are developed. The study concludes that the treatment provided by intermittent sand filtration met the nutrient requirements of the emerging ecology and that no health hazards were demonstrated by the viral or other findings for the present recreational uses of boating and fishing. (Author)

PB-169 371 **Field 13B, 8H**
CFSTI Prices: HC$7.30 MF$1.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
SYMPOSIUM ON STREAMFLOW REGULATION FOR QUALIP
PHS Pub-999-WP-30
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Water supplies, Quality control), (*Water pollution, Control), Sanitary engineering, Wastes (Sanitary engineering), Dams, Oxidation, Photo synthesis, Fluid flow, Symposia.

Papers describing the relation of streamflow regulation for quality control to the major Federal water resource development programs (Public Health Service, Corps of Engineers, Bureau of Reclamation, Soil Conservation Service, and Federal Power Commission), to State and Federal water rights, and to public expectations in water resource development programs, were presented. Other papers considered the effects of impoundments on thermal stratification, biochemical oxidation, photosynthetic oxygen production, and chemical solution and precipitation in reservoirs; the effects of flow regulation on waste assimilation, mineral quality, temperature, and nutrients; hydrologic data needs, statistical studies of storage yield relationships, and establishment of quality objectives for flow regulation projects; measures for improving the quality of reservoir discharges through selection of discharge level, turbine aeration, and reservoir mixing and aeration; and the place of monitoring and cooperative effort in the solution of water quality problems through flow regulation. (Author)

PB-169 474 **Field 13B, 6F**
CFSTI Prices: HC$3.00 MF$0.75
Louisiana State Univ., Baton Rouge. Div. of Engineering Research.
HERBICIDES FOR ROADSIDES IN LOUISIANA: INVESTIGATION OF METHODS FOR CONTROLLING WEEDS AND BRUSH AND RETARDING VEGETATIVE GROWTH CHEMICALLY,
by William A. Hadden, Donald A. Alexander,Carl H. Thomas, and Harold T. Barr. 1965, 86p Engineering Research Bull-87
Prepared in cooperation with Louisiana State Univ. and Agricultural and Mechanical Coll., Baton Rouge.

Descriptors: (*Roads, Herbicides), (*Herbicides, Roads), Louisiana, Acetic acids, Chlorine compounds, Propionic acid, Arsonic acids, Sodium compounds, Aliphatic compounds.

Identifiers: Highways.

The first part of this study was organized to gather facts on the use of herbicides along roadsides to control vegation and to determine what action Louisiana should take with respect to the use of herbicides. During the second part of this study specific herbicides were applied under controlled conditions to selected highway rights of ways and around obstructions. Good control of roadside vegetation is obtained by applying any of the following treatments: trichloroacetic acid at 50 pounds/acre, dalapon (2,2-dichloropropionic acid) at 8 pounds/acre, disodium monomethyl arsonate at 6 pounds/acre, and herbicidal oil for trimming.

PB-169 480 **Field 13C, 8G, 13B**
CFSTI Prices: HC$3.00 MF$0.50
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
AN IMPROVED PARTICLE INDEX TEST FOR THE EVALUATION OF GEOMETRIC CHARACTERISTICS OF AGGREGATES,
by Eugene Y. Huang. Jul 65, 58p Rept. no. 0275
Proj. 86546
Prepared in cooperation with Michigan State Highway Dept., Bureau of Public Roads, Washington, D. C.

Descriptors: (*Rock (Geology), Geometric forms), (*Particles, Geometric forms), (*Pavements, Rock (Geology), Test methods, Volume, Time.

Identifiers: Aggregates (Materials), Ev

The new procedure involves the use of a specially designed volumeter, which permits the direct determination of the volume of the rodded aggregate mass in the rhombohedron mold. This modification achieves the advantage of eliminating the necessity of adjusting the surface of the rodded aggregate mass, according to the original procedure, and the personal equation in this operation. The new procedure gives the same results as the original procedure, in less time, and can be performed by an inexperienced operator. The results of the 'angularity' test, 'shape factor' test, and 'time index' test have indicated that they are all related to the particle index values of the aggregate samples tested. The fact that the particle index test may be applied to a wider range of aggregate materials than the other tests indicates its versatility and superiority as a useful tool for identifying the

geometric characteristics of mineral aggregates for pavement purposes. (Author)

PB-169 481 **Field 13C, 8G, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
AN ANNOTATED BIBLIOGRAPHY ON THE GEOMETRIC CHARACTERISTICS OF MINERAL AGGREGATES FOR PAVEMENT PURPOSES,
by Eugene Y. Huang and O. David Boutilier. Jun 65, 67p Rept. no. 0274
Proj. 86546
Prepared in cooperation with Michigan State Highway Dept. and Bureau of Public Roads, Washington, D. C. See also PB-169 480, PB-169 483.

Descriptors: (*Rock (Geology), Geometric forms), (*Particles, Geometric forms), (*Pavements, Rock (Geology)), (*Bibliographies, Rock (Geology)), Surface properties.

Identifiers: Aggregates (Materials).

The bibliography constitutes a report on the initial phase of a study aimed at the determination of the desirable geometric characteristics (embracing shape, angularity, and surface texture) of aggregate materials for different types of pavement construction. The contents in the bibliography are classified and arranged by subject, in order to facilitate easy reference to specific topics. (Author)

PB-169 483 **Field 13C, 8G, 13B**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
A STUDY OF THE RELATION BETWEEN THE PARTICLE INDEX OF THE AGGREGATE AND THE PROPERTIES OF BITUMINOUS AGGREGATE MIXTURES,
by O. David Boutilier. Jul 65, 43p Rept. no. 0273
Proj. 86546
Prepared in cooperation with Michigan State Highway Dept. and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Rock (Geology), Geometric forms), (*Particles, Geometric forms), (*Bituminous materials, Pavements), Test methods, Asphalt, Gravity.

The study was made to determine if there was any significant relationship between the properties of bituminous aggregate mixtures and Huang's 'particle index' (PB-169 480) of the aggregate used. For certain mixtures, there appears to be a relationship between this particle index and the optimum asphalt content. There is no apparent relationship between the particle index and the specific gravity, percent air voids, percent voids in the mineral aggregate, or in the percent voids filled with asphalt. The authors conclude, although this investigation was limited to one source and gradation of aggregate, that the method may be valuable for predicting the properties of bituminous paving mixtures. (Author)

PB-169 733 **Field 13C, 13B, 11B**
CFSTI Prices: HC$4.00 MF$0.75
Clark, Dietz, Painter and Associates, Memphis, Tenn.
STUDY OF NATURAL VARIATIONS IN HIGHWAY MATERIALS. VOLUME I: ANALYSIS, REPORT AND APPENDIX.
1966, 101p
Contract CPR-11-1634

Descriptors: (*Roads, Materials), (*Materials, Roads), (*Quality control, Roads), Soils, Pavements, Standards, Density, Moisture, Asphalt, Concrete, Experimental data, Gravel, Sand, Clay, Landing fields.

The purpose of this study was to obtain and analyze data concerning the natural variations in pertinent qualities of soil, base, and flexible pavement materials with a view to establishing specification limits to be used in statistical quality control of highway construction. The data was obtained from the Corps of Engineers, from projects constructed for experimental purposes, as well as airfield construction projects. The data analyzed include density and moisture content of subgrades; density, moisture content and gradation of base courses; and density and aggregate gradation of asphaltic concrete pavement. Statistical parameters were computed and a sample specification written for use in the control of compaction of subgrade soils. (Author)

PB-169 743 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.50
Aase (George) and Associates, Inc., Tallahassee, Fla.
RESULTS OF CORE DRILLING AND FOUNDATION TESTING FOR A DAM, RESERVOIR AND WATER DIVERSION SYSTEM IN THE DEADENING LAKES AREA, WASHINGTON COUNTY, FLORIDA.
1966, 57p
Contract CC-6100

Descriptors: (*Reclamation, Florida), (*Dams, Florida), (*Engineering geology, Dams), (*Civil engineering, Dams), Well logging, Geology, Founda tions (Structures), Hydrology, Inland waterways, Natural resources, Recreation, Feasibility studies, Maps.

The purpose of this study is to gather data on foundation and reservoir conditions along Econfina Creek at two proposed dam sites and along the center line of a proposed diversion canal system to indicate the feasibility of construction of a dam, reservoir, diversion system and appurtenant water control structures for stabilization of water levels in the Deadening Lakes area. The investigation was designated to indicate the feasibility of implementing a plan, formulated by the Washington County Development Authority, to stabilize water levels in the area and thereby facilitate development of a water-oriented recreational complex. The scope of this study is limited to an investigation, by core drilling and testing, of foundation and reservoir conditions having a bearing on construction of the proposed dam, reservoir and water diversion system in the specific area in which these proposed works are to be located. However, the results of this investigation, because of certain geological problems and hydrologic conditions prevailing in the area, cannot be fully evaluated without discussing in some detail the concurrent hydrologic and geological investigations conducted by the U. S. Geological Survey over a much broader area (Musgrove, Toler and Foster, 1964). (Author)

PB-169 904 **Field 13B, 5A, 5K, 5D**
CFSTI Prices: HC$7.30 MF$2.00
Wise (Harold Franklin), Washington, D. C.
A PROGRAM FOR COMPREHENSIVE PLANNING AND DEVELOPMENT IN THE NATIONAL CAPITAL REGION. A DESIGN FOR DECISION MAKING AND ACTION,
15 Dec 65, 426p
Availability: Original document in color until exhausted. Sponsored by Metropolitan Washington Council of Governments.

Descriptors: (*District of Columbia, Urban planning), (*Urban planning, District of Columbia), (*Decision making, Urban planning), Management planning, Economics, Sociology, Employment, Population, Housing, Transportation, Education, Public health, Recreation, Criminology, Police, Political science, Urban areas, Civil engineering.

Identifiers: National Capital Region, Washington Metropolitan Area.

This report first looks at the metropolitan phenomenon in the country and in the Metropolitan Washington Region. It examines the imperatives for regional planning and decision making brought about by the fact of metropolitan growth and development here. Secondly, 'the Federal imperatives' are considered, by which is meant the laws that the recent Congresses have passed that provided for certain levels of regional consensus as a condition precedent to financial assistance. These laws pertain, of course, to all of the metropolitan areas in the country. Thirdly, the report deals with the existing organization of government for planning and action in the metropolitan area. Fourthly, the report sets forth, against the background of the previous three sections a series of guidelines for future metropolitan organization for planning and decision making. These guidelines are meant for debate and discussion to lead to the consensus for action that must inevitably come in this most important region.

PB-169 905 **Field 13B**
CFSTI Prices: HC$4.00 MF$1.00
Johns Hopkins Univ., Baltimore, Md.
REPORT ON SANITARY SEWERS AND WASTE WATER DISPOSAL IN THE WASHINGTON METROPOLITAN REGION,
by Abel Wolman and John C. Geyer. Jun 62, 146p Rept. no. 0424

Descriptors: (*Sewage, District of Columbia), (*Potomac river, Sanitary engineering), (*Sanitary engineering, Potomac river), Maryland, Virginia, Wastes (Sanitary engineering), Urban planning, Urban areas, Disposal, Water pollution, Water supplies.

Identifiers: Washington Metropolitan Area, National Capital Region.

Sewers will serve an estimated 3,000,000 people by 1980 and 4,600,000 people by the year 2000. The resulting average sewage flows are estimated at 375 million gallons per day in 1980 and 645 million gallons per day in year 2000. These flows will, by 1980, deliver to the sewage treatment plants each day about 800 thousand pounds of suspended solids, and organic materials requiring about 700 thousand pounds of oxygen for stabilization. For the year 2000, these figures are estimated at 1200 and 1100 thousand pounds, respectively. Preservation in the Estuary of the Potomac River, in the Washington Region, of water of suitable quality for park, general recreational and historic monument purposes requires that all wastes in the Region be treated to remove at least 80 per cent of the BOD load before discharge into the River. An even higher degree of treatment will be required in future years. Maximum assimilation in the Potomac Estuary of the remaining BOD load after treatment will also require that sewage from the lower counties of the Region be treated in separate plants discharging at various points along the Estuary rather than be pumped back to the Blue Plains plant of the District of Columbia for treatment.

PB-169 907 **Field 13F, 13B**
CFSTI Prices: HC$6.00 MF$1.50
Klauder (Louis T.) and Associates, Philadelphia, Pa.
PRELIMINARY ENGINEERING REPORT ON POSSIBLE IMPROVEMENTS TO RAILROAD PASSENGER SERVICE BETWEEN NEW YORK AND BOSTON.
15 Nov 65, 191p
Rept. on U. S. Dept. of Commerce Northeast Corridor Transportation Proj.

Descriptors: (*Railroads, Optimization), (*Transporta tion, Railroads), Railroad tracks, Bridges, Buildings, Railroad cars, Cost effectiveness, Engineering, Feasibility studies, New York, Connecticut, Massachusetts, Rhode Island, Civil engineering.

Identifiers: Northeast Corridor Transportation project, High-speed passenger transportation.

The purpose of this report is to set forth the changes and additions which might be made in order to

reduce the travel time between New York and Boston to 2-1/2 hours, 2-3/4 hours, or 3 hours. In the study of 3-hour travel time top speeds of both 125 mph and 150 mph are considered. In studies of 2-3/4 hour travel time two possibilities are considered: first that the improvements to the right-of-way necessary to reduce the travel time to 2-3/4 hours might be made between New Haven and Providence where the costs are relatively modest, and, second, that these improvements might be made between New York and New Haven where the costs are considerably higher.

14. METHODS AND EQUIPMENT

AD-465 416 **Field 14D, 17B, 12A**
CFSTI Prices: HC$8.60 MF$0.75
Electronic Systems Div., L. G. Hanscom Field, Mass.
VERIFICATION OF QUANTITATIVE MAINTAINABILITY REQUIREMENTS,
by Giacomo Grippo and Richard M. DeMilia.
May 65, 81p ESD-TR-65-220

Descriptors: (*Maintainability, Command and control systems), (*Command and control systems, Maintainability), Decision making, Reliability, Statistical functions, Mathematical prediction, Probability.

This document develops basic concepts for treating Maintainability quantitatively, with particular attention devoted to probabilistic aspects. It focuses on the special characteristics of the Lognormal Distribution as they relate to specifying and demonstrating numerical requirements. A catalog of Lognormal curves (both density and cumulative distribution functions) are included as well as recommended accept-reject criteria for Maintainability demonstration. (Author)

N66-11630 **Field 14B**
CFSTI Prices: HC$7.00 MF$2.00
Advisory Group for Aeronautical Research and Development, Paris (France).
SPACE SIMULATION CHAMBERS AND TECHNIQUES,
by B. H. Goethert. Dec 64, 405p AGARDOGRAPH-93

Descriptors: *Chamber, *Environmental chamber, *Instrumentation, *Environment simulation, *Space simulation, *Vacuum pump.

N66-14297 **Field 14E**
CFSTI Prices: HC$4.00 MF$0.75
Fairchild Camera and Instrument Corp., Syosset, N. Y.
CAMERA AND FILM PROCESSOR.
Final engineering rept.,
by G. L. Haines. 12 Aug 65, 110p
Contract NAS7-100
NASA CR-68973
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Systems Management and Engineering Dept., rept. nos. JPL-950794, SME-AF-22.

Descriptors: *Data storage, *Mars surface, *Photo graphic film.

N66-15233 **Field 14B**
CFSTI Prices: HC$4.00 MF$0.75
General Applied Science Labs., Inc., Westbury, N. Y.
PRELIMINARY DESIGN AND TEST OF HIGH ENTHALPY DEVICE,
by I. Nathan, M. Novack, and M. Recarey. 1964, 119p
Contract NAS1-3909
NASA CR-66015

Descriptors: *Enthalpy, *Kinetic energy, *Exhaust, *Piston, *Shock tunnel.

N66-15610 **Field 14E**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park.
ELECTRONIC SHUTTER CONTROL FOR PLANETARY PHOTOGRAPHY WITH AUTOMATIC TIME RECORDING CAPABILITY,
by C. F. Mozer. Dec 65, 17p TN-701-66-11
Grant NsG-142
NASA CR-69488

Descriptors: *Electromechanical device, *Recording instrument, *Semiconductor device, *Electronics, *Photography.

PB-169 444 **Field 14B, 13J, 9A, 5A**
CFSTI Prices: HC$1.25 MF$0.50
Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS.
Mar 66, 50p

Descriptors: (*Naval research, Reports), (*Coatings, Submarines), Electron beams, Chemistry, Mechanics, Metallurgy, Ceramic materials, Nuclear physics, Atoms, Optics, Exhaust gases, Lasers, Sound.

Identifiers: Sozotron project.

Complete papers: Submarine topside coatings for application in cold, damp weather; and The NRL Sozotron project. Summaries are given of research in the following fields: chemistry, mechanics, metallurgy and ceramics, nuclear and atomic physics, optical physics, radio, and sound.

PB-169 914 **Field 14B**
CFSTI Prices: HC$2.60 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
CRYSTAL MONITORED SIGNAL GENERATOR SG-1A/ ARN WITH POWER SUPPLY PP 348/ ARN.
Technical manual instrument calibration procedure, AG-72.
15 Dec 65, 25p
Contract N123 (62861)-35056A
NAVWEPS 17-20AG-72

Descriptors: (*Signal generators, Calibration), Instruction manuals, Radiofrequency, Test equipment, Instrumentation, Power supplies.

A procedure is described for the calibration of the SG-1A/ARN signal generator, which is designed to produce radio frequency signals that are vairable from 0.1 uv to 0.2 volts into a 53 ohm load, modulated or unmodulated, over a continuous frequency range of 88 to 144 Mc. The instrument being calibrated will be referred to herein as the Test Instrument. The power supply for the Test Instrument is contained in a separate cabinet and is designated as PP-348/ARN.

PB-169 915 **Field 14B**
CFSTI Prices: HC$2.60 MF$0.50
Autonetics, Anaheim, Calif.
PULSE GENERATOR LA-593A (LAVOIE).
Technical manual instrument calibration procedure, AG-97.
15 Jan 66, 22p
Contract N123 (62861)-50267A
NAVWEPS 17-20AG-97

Descriptors: (*Pulse generators, Calibration), Instruction manuals, Instrumentation, Test methods, Test equipment.

A procedure is described for the calibration of the Lavoie pulse generator model LA-593A which provides two square output pulses, a sync pulse, and a sine wave output. The pulse rate frequency of the output is controlled by the internal generator or an external generator can be used. The internally controlled frequency range is 20 to 200,000 Hz for all outputs. The instrument being calibrated will be referred to herein as the Test Instrument.

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

N66-10097 **Field 17I**
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment (Australia).
STUDIES OF OPTIMUM STATION SITTING IN DOP- PLER TRACKING SYSTEMS. A NOTE ON THE ACCURACY TO BE EXPECTED OF A POLYSTATION FIX-FREE SYSTEM,
by A. E. Jordan. Dec 63, 42p WRE-TN-SAD-132

Descriptors: *Doppler effect, *Tracking system.

N66-13900 **Field 17B**
CFSTI Prices: HC$2.00 MF$0.50
Compagnie Generale De Telegraphie Sans Fil, Paris (France).
PASSIVE SATELLITE SYSTEM FOR EUROPEAN TELEVISION BROADCASTING,
by C. Plottin. 14 Jan 65, 37p Rept.-5.023 A

Descriptors: *Passive satellite, *Satellite television, *Relay satellite, *Television transmission.

N66-14147 **Field 17B**
CFSTI Prices: HC$5.00 MF$1.00
Defence Research Telecommunications Establishment, Ottawa (Canada).
ALOUETTE I - ALOSYN IONOSPHERIC DATA, 16 JANUARY 1963 TO 31 JANUARY 1963.
1965, 154p

Descriptors: *Alouette I satellite, *Ionospheric sounding.

N66-14276 **Field 17B**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Washington, D. C.
SATELLITE COMMUNICATIONS - SIX YEARS OF ACHIEVEMENT, 1958-1964.
1 Mar 65, 106p NASA-TM-X-57060

Descriptors: *Technology, *Communications satellite, *United States.

N66-17052 **Field 17B**
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART VI. COMMUNICATIONS AND NAVIGATION/TRAFFIC CONTROL.
21 Feb 66, 146p
Contract NASw-1215
NASA CR-70346

Descriptors: *Navigation system, *Communication system, *Experiment design, *Manned orbital research laboratory (Morl), *Traffic control.

18. NUCLEAR SCIENCE AND TECHNOLOGY

N66-10069 **Field 18D**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
A PORTABLE LEAK DETECTOR FOR HEAVY WATER,
by R. B. Shields. Apr 65, 27p AECL-2278

Descriptors: *Detector, *Leakage, *Measuring apparatus, *Water.

N66-10440 **Field 18G**
CFSTI Prices: HC$3.00 MF$0.75
Atomic Energy of Canada, Ltd., Chalk River (Ontario).
MEASUREMENT OF FAST FISSION RATIOS IN NATURAL URANIUM,
by C. B. Bigham. Aug 65, 93p AECL-2285

Descriptors: *Radiation measurement, *Uranium 235, *Fission product, *Uranium 238.

N66-13427 **Field 18I**
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy of Canada Ltd., Chalk River (Ontario).
THE DESIGN AND PERFORMANCE OF A PROPOSED ION CHAMBER ARRANGEMENT TO MONITOR THE NEUTRON FLUX OF THE NRU REACTOR,
by W. J. Henderson, P. R. Tunnicliffe, and A. G. Ward. Jul 64, 8p AECL-2037, RDP-53

Descriptors: *Ion chamber, *Monitor, *Neutron flux.

N66-13902 **Field 18J**
CFSTI Prices: HC$7.00 MF$1.75
European Atomic Energy Community, Brussels (Belgium).
DATA HANDBOOK FOR SENSITIVITY CALCULATIONS IN NEUTRON ACTIVATION ANALYSIS,
by F. Girardi, G. Guzzi, and J. Pauly. 1965, 317p EWR-1898.E

Descriptors: *Neutron activation, *Handbook.

N66-13929 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
PRECRITICAL CALCULATIONS FOR THE 3.0 IN. PITCH, BERYLLIUM REFLECTED, TWMR CRITICAL ASSEMBLY,
by J. M. Lovallo and J. C. Peak. 8 Nov 65, 19p GA-6807
Contract SNPC-27
NASA CR-54786

Descriptors: *Reactor, *Nuclear rocket, *Tungsten.

N66-14062 **Field 18N**
CFSTI Prices: HC$3.00 MF$0.50
Aerojet-General Corp., Azusa, Calif.
SNAP-8 MATERIALS REPORT FOR JANUARY-JUNE 1964. VOLUME I. ELECTRICAL INSULATION DEVELOPMENT,
by R. P. Dillingham. Jul 64, 51p Rept.-2880, Vol. I.
Contract NAS-5-417
NASA CR-54716

Descriptors: *Electric insulation, *System for nuclear auxiliary power.

N66-14063 **Field 18N**
CFSTI Prices: HC$3.00 MF$0.75
Aerojet-General Corp., Azusa, Calif.
SNAP-8 MATERIALS REPORT FOR JANUARY-JUNE 1964. VOLUME II. DEVELOPMENT OF COMPONENT MATERIAL,
by H. Derow and B. E. Farwell. Jul 64, 68p Rept. no. 2880, Vol. II.
Contract NAS5-417
NASA CR-54717

Descriptors: *Nozzle, *System for nuclear auxiliary power, *Turbine.

N66-14078 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
THERMAL AND MECHANICAL STUDIES OF SOLID-SOLID CONTACTS,
by S. Giuliani and C. Mustacchi. Aug 65, 53p EUR-2486.E

Descriptors: *Cladding, *Fuel element, *Reactor fuel, *Thermal property, *Mechanical property.

N66-14079 **Field 18K, 22A**
CFSTI Prices: HC$3.00 MF$0.75
Atomic Energy of Canada, Ltd., Chalk River (Ontario). Physics Div.
PROGRESS REPORT, APRIL 1-JUNE 30, 1965. PART 3. PHYSICS DIVISION,
by L. G. Elliott. 1965, 63p PR-P-66, AECL-2501

Descriptors: *Neutron physics, *Nuclear physics, *Research project, *Canada, *Theoretical physics.

PB-169 358 **Field 18J, 13L**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE SUR L'EXTINCTION DES FEUX DE PLUTONIUM EN BOITES A GANTS (Study of Plutonium Fire Extinction in Glove-Boxes),
by Henri Boisson, Andre Chappellier, Alain Debiar, and Jacques Savornin. Dec 65, 20p CEA-R-2931
Text in French; Attached Summary in English.

Descriptors: (*Reactor fuels, Fires), (*Plutonium, Fires), (*Fire extinguishers, Effectiveness), Uranium, Powders, Fire safety, France.

Identifiers: Glove boxes.

The report concerns attempts to extinguish fires in uranium - chosen as a basis for comparison - and in plutonium, these being contained in glove boxes. The extinguishing powders TEC and MG 10 were tried and compared. The operator used in plastic bags. The metal was dealt with respectively in the form of billets, compact chips and finally thin shavings. In each case, fire control was without difficulty. One must allow a certain time for cooling. The powder MG 10 showed very good results. Moreover, the trials proved that densely packed shavings are a very real security factor. The interior lay-out of the glove boxes ought, in order to facilitate further manipulations, be such as to render extinction as easy as possible should the need arise. (Author)

PB-169 360 **Field 18J, 5C, 14A**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Paris (France).
COUTS D'INVESTISSEMENT ET D'EXPLOITATION DES USINES DE RETRAITEMENT DE L'URANIUM NATUREL IRRADIE (Capital and Operating Costs of Irradiated Natural Uranium Reprocessing Plants),
by Lucien Thiriet, Claude Jouannaud, Jacques Couture, Jacques Duboz, and Claude Oger. Jan 66, 36p CEA-R-2937
Bilingual text in English and in French.

Descriptors: (*Uranium, Processing), (*Reactor fuel processing, Costs), Industrial plants, Economics, Industrial production, Operation, France.

The paper presents first a method of analysing natural uranium reprocessing plants investment costs (method similar to Lang's and Bach's well known in the fuel oil industry) and their operating costs (analysed according to their economic type). This method helps establish standard cost structures for these plants, thus allowing comparisons between existing or planned industrial facilities. It also helps evaluating the foreseeable consequences of technical progress. Some results obtained are given, concerning the investment cost sensitivity to the various technical parameters defining the fuel and their comparison according to the country or the economic area taken into account. (Author)

PB-169 404 **Field 18G**
CFSTI Prices: HC$3.00 MF$0.75
Weapons Systems Evaluation Group (Defense), Washington, D. C.
ENERGY AND TIME BETA RAY SPECTRA OF FISSION PRODUCTS OF U235 BY FISSION NEUTRONS AND U238 BY 14 MEV NEUTRONS.
Research memo.,
by Robert B. Heller. 16 Feb 61, 62p WSEG-RM-19
AD 254 212

Descriptors: (*Fission products, Beta-ray spectrum), (*Uranium, Fission products), (*Beta-ray spectrum, Fission products), Neutron reactions, Programming (Computers), Radioactive isotopes, Fission product activity.

The primary purpose of the report is to provide a practical estimate of the beta ray spectrum from fission products at short times after fission. The machine program developed to furnish this information automatically provides the spectrum for later times at very little additional effort, together with the distribution of beta radiation by specific nuclides. This information was developed and is presented for 14 MEV neutron fissioning of U238 and also for U235 fissioned by fission neutrons. (Author)

PB-169 459 **Field 18D, 7E, 18G**
CFSTI Prices: HC$2.00 MF$0.50
Institutt for Atomenergie, Kjeller (Norway).
ON THE LIQUID SCINTILLATION DETERMINATION OF Pu-239 IN PURE AND CONTAMINATED SOLUTIONS,
by K. Joon, P. A. Deurloo, and I. A. Hundere. Nov 65, 39p KR-100

Descriptors: (*Plutonium, Scintillation counters), (*Scintillation counters, Plutonium), N-heterocyclic compounds, O-heterocyclic compounds, Naphthalene, Adsorption, Complex compounds, Counting methods, Alpha particles, Beta particles, Quenching (Inhibition), Uranium, Fission products, Solutions, Norway.

Identifiers: Bis (Methylphenyl oxazolyl) Benzene, Diphenyl oxazoles, Sequestering agents.

The possibilities with respect to the application of liquid scintillation counting for routine determinations of Pu were investigated, using a scintillator solution composed of PPO, dimethyl-POPOP, and naphtalene in p-dioxane. Regarding radiochemically pure Pu-solutions, it appeared that this technique is very well suited for the purpose, provided the Pu is prevented from adsorption on the wall of the counting vial. This can be obtained by addition of a suitable complexing agent to the scintillation liquid. The influence of quenching can be avoided by checking the place of the Pu-channel, by standardization of the composition of the scintillator-active sample mixture or by integral counting. The counting efficiency is 100 %. Radiochemical impurities may interfere to a greater or lesser extent, depending upon the nature of the activity (alpha or beta), the maximum energy of

this radiation, the impurity to Pu ratio and quenching conditions. For natural uranium and the fission products (Ce-Pr)-144, Cs-137, (Ru-Rh)-106, and (Zr-Nb)-95 this was investigated. Methods for correction are mentioned. (Author)

PB-169 523 **Field 18B, 7E**
CFSTI Prices: HC$2.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
INFLUENCE DE L'HUMIDITE ET DE LA CONCENTRA- TION EN IODE SUR L'ADSORPTION DE L'IODE 131 PAR LES CHARBONS ACTIFS (The Influence of Physical Parameters on the Adsorption of Iodine 131 by Activated Charcoals),
by Francois Billard, Gerard Chevalier, Jacques-Caron, and Jean Van der Meersch. Jan 66, 26p CEA-R-2908
Text in French; Attached Summary in English.

Descriptors: (*Iodine, Adsorption), Radioactive isotopes, Charcoal, Humidity, Concentration (Chemistry), Air-in take filters, Effectiveness, Vapors, Thermodynamics, France.

Following an outline of means of generating iodine 131 in the gas phase and a brief description of the apparatus used, an analysis is given of the experimental results obtained on the trapping of iodine 131 by activated charcoal. The efficiency depends concurrently on the relative humidity and the iodine concentration of the air. While it is independent of this concentration in dry air, it does not exceed 50 in moist air, whatever the bed depth, when the concentration is less than 1 mCi/m3, then it increases with the concentrations to reach values close to those obtained in dry air for concentrations of around 1000 Ci/m3. At the same time the efficiency of a dust filter with respect to iodine remains very low in dry air whatever the iodine concentration; in moist air this efficiency, which is high at low concentrations, decreases when the latter increases. In addition if a charcoal bed is divided into several beds, separated by an amount corresponding to a passage time of about a second, it is found that the efficiency of the whole is appreciably higher than that of the initial bed. These results appear to establish the existence of at least two forms of iodine, one molecular form and one particulate form probably formed by clusters, the forms equilibrium being functions of the relative concentrations of iodine and water vapour in the air. The third form evidence, a gaseous form compound, remains hypothetical; the experimental curves can be explained either by the molecular and particular forms reversibility or by the increase of clusters size with the relative humidity of the air. (Author)

PB-169 527 **Field 18D, 20H**
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
REALISATION ET ETUDES DES PERFORMANCES D'UN SPECTROMETRE A SCINTILLATION (Construction and Performance-Testing of a Scintillation Spectrometer),
by Jean Berthier, Pierre Locard, Jean-Claude Hocquenghem, and Gerard Goin. Mar 66, 84p CEA-R-2901
Text in French; Attached Summary in English.

Descriptors: (*Nuclear radiation spectrometers, Scintillation counters), (*Scintillation counters, Nuclear radiation spectrometers), Construction, Performance (Engineering), Coincidence counting, Photomultipliers, Time-to-pulse-height converters, Beta-ray spectroscopy, Gamma-ray spectroscopy, France.

The realisation of a scintillation spectrometer, based on the 'Fast-slow' coincidences technique is described. The counters use 56 A.V.P. fast photomultipliers. The fast coincidences unit can also be used as time-to-height pulses convertor. The resolving time, with two NaI crystals, is about 14 nanoseconds. It is shown that the following measurements which can be undertaken with the apparatus: beta-gamma or gamma-gamma coincidences, 'Sum-spectra', life time measurements, beta-gamma or gamma-gamma directional angular correlation measurements (with detection or not of the linear polarization) and, for each case, the results of test-measurements are given. (Author)

PB-169 530 **Field 18D**
CFSTI Prices: HC$6.60 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
APPLICATION DES TECHNIQUES NOUVELLES DE L'ELECTRONIQUE RAPIDE A LA DETERMINATION DE L'INSTANT PRECIS DE DETECTION D'UNE PARTICULE (Application of New Fast-Electronic Techniques to the Determination of the Exact Moment of Particle Detection).
Doctoral thesis in French,
by Michel Hesse. 3 Jun 65, 61p CEA-R-2885
Text in French; Attached Summary in English.

Descriptors: (*Scintillation counters, Resolution), (*Photomultipliers, Resolution), Electromagnetic pulses, Statistical analysis, Circuits, France.

Fluctuations in the time response of photomultipliers employed in scintillation counting were studied and experimentally checked. Statistical measurements of the output pulses show that the relative variance of the time fluctuations is minimum for the portion located around the bending point of the leading edge. A shaping circuit using this property is described. Experimental results are given, showing an improvement of the resolving time. (Author)

PB-169 533 **Field 18H, 18G**
CFSTI Prices: HC$1.60 MF$0.50
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
ESSAI D'EVALUATION DU DEPOT CUMULATIF DE STRONTIUM 90 DANS PLUSIEURS STATIONS FRANCAISES (Attempt to Evaluate the Cumulative Deposit of Strontium 90 in Several French Centres),
by Arlette Garnier. Mar 66, 17p CEA-R-2930 EUR 2644-f
Rept. on Niveaux de Contamination Radioactive du Milieu Ambiant et de la Chaine Alimentaire.
Text in French; Attached Summary in English.

Descriptors: (*Radiological contamination, Control), (*Radioactive fallout, Numerical analysis), (*Strontium, Radioactive fallout), Atmosphere, Rainfall, Nuclear physics laboratories, Deposition, France.

In order to be able to interpret results of radio-activity controls of the ambiant atmosphere and of the supply chain carried out in several French centres, it is necessary to know the value of the cumulative strontium-90 deposit resulting from fall-out. The esthmation of the fall-out which occurred locally in the years before systematic controls were established can be made by assuming that the Sr90 concentration in rain varies little from one place to another (if they are fairly close) and that the deposit can be deduced from that measured in a single station by making corrections for differences in the rainfall. This assumption is confirmed by applying the method to the calculation of Sr90 fall-out at Ispra, Mol and at several French centres: the values calculated are compared to those obtained by measurements carried out since 1958 in some cases, and since 1960 in others. The results show that the method is valid for calculating fall-out prior to 1960 (in the absence of information) and to deduce with sufficient approximation the subsequent cumulative deposits in the French centres under consideration. (Author)

19. ORDNANCE

AD-287 292 **Field 19D, 19A, 13B**
CFSTI Price: HC$14.60
Army Engineer Research and Development Labs., Fort Belvoir, Va.
DEMOLITION OF CONCRETE LOCKS ON THE OHIO RIVER (DELIBERATE PHASE),
by James A. Dennis. 31 Jul 62, 150p TR-1718 Task 8F07-10-002-02

Descriptors: (*Demolition, Concrete), (*Demolitions, Tests), (*Dams, Demolition), Military training, Frag mentation, Steel, Underwater explosions, Explosion effects, Blast, Explosive materials, Experimental data, Plastic explosives, Delay elements (Explosive), Inland waterways, Rivers, Piers, Power plants (Establishments).

Report covers a test program in which concrete lock structures on the Ohio River were demolished by blasting with Composition C-4 explosive and millisecond delay electric caps. Internal charges of Composition C-4 explosive detonated in multiple rows of boreholes were evaluated for breaching both reinforced and unreinforced concrete walls 1 to 14 feet thick. Millisecond delay blasting techniques were used to establish the effectiveness of millisecond delay electric caps for reduction of air blast and ground shock, improvement of fragmentation, and control of throw of fragments. A recently developed demolition technique for cutting steel rods was tested by using specially designed explosive charges to cut steel valve shafts under water. Report concludes, in part: (1) Millisecond delay blasting results in reduction of air blast and ground shock, increased fragmentation with reduced explosive quantity, and controlled throw of fragments; (b) millisecond delay blasting techniques can be applied to military demolition tasks requiring controlled blasts; blasting with millisecond delay electric caps can be used in explosives and demolition training at installations in heavily populated areas to reduce concussion and noise which generate complaints and claims; and (c) blasting with internal charges in multiple rows of boreholes detonated in sequence with millisecond delay caps gives increased yield in terms of cubic yards of concrete removed per pound of explosive. (Author)

PB-169 424 **Field 19D, 13M**
CFSTI Price: HC$4.60
Armour Research Foundation, Chicago, Ill.
A SIMPLE METHOD FOR EVALUATING BLAST EFFECTS ON BUILDINGS.
Revised ed.
Jul 54, 48p
Contracts AF 33 (616)-163, AF 33 (038)-9761 AD 38 891

Descriptors: (*Buildings, Blast), (*Blast, Nuclear explosions), Steel, Concrete, Models (Simulations), Loading (Mechanics), Force (Mechanics), Elasticity, Motion, Numerical analysis.

A method is presented for estimating the approximate effect of an atomic blast on one-story steel and concrete buildings which have specified length-width-height ratios and which are 'closed,' almost completely closed,' or 'open.' The object of the method is to calculate the order of magnitude of the maximum displacement of the top of the building. This displacement is not calculated directly. Rather a measure of the displacement is obtained by analyzing the behavior of a mass-spring model which is, elastically, similar to the building and which is subjected to a similar force. The motion of this model is assumed to be indicative of the motion of the building under the actual blast. A detailed procedure for computing the approximate deflection of the building is included and is supplemented by a numerical example. An estimate of the accuracy of the method is furnished. (Author)

20. PHYSICS

AD-408 915 **Field 20I, 10B**
CFSTI Price: HC$3.00
Hughes Research Labs., Malibu, Calif.
CESIUM PLASMA STUDIES FOR THERMIONIC ENERGY CONVERSION.
Final rept., phase 2,
by J. Y. Wada and R. C. Knechtli. Jun 63, 87p
Rept. no. 0015
Contract Nonr-3501 (00), ARPA-Order-209-62
Task 399-358

Descriptors: (*Thermionic converters, Plasma physics), (*Plasma physics, Thermionic converters), (*Cesium, Plasma physics), Thermionic emission, Electrons, Gas ionization, Temperature, Measurement, Tantalum, Resistance (Electrical), Plasma sheath, Plasma medium, Attenuation, Scattering, Ions, Transport properties.

The processes of thermalization of fast electrons injected into a plasma through a plasma sheath are investigated because such injection and thermalization are believed to occur in the plasma of the low voltage are cesium plasma thermionic energy converter. The resistivity of highly ionized plasmas is investigated because it accounts for an important part of the internal voltage drop in thermionic energy converters, particularly when the internal resistive voltage drop is minimized by minimizing the effect of electron-neutral collisions. Unavoidable Coulomb collisions are then predominant, and the resultant plasma resistivity approaches that of a fully ionized plasma. Investigations on the probability of neutralization of cesium ions on hot tantalum are reported here as a by-product obtained in using the cesium plasma apparatus developed for the other experiments conducted in the course of this work.

AD-458 662 **Field 20L, 20B, 13H**
CFSTI Price: HC$6.60
Westinghouse Research Labs., Pittsburgh, Pa.
DEPOSITION OF SILICON ON INSULATING SUBSTRATES.
Scientific rept. no. 1, 1 Jul-31 Dec 64,
by Ting L. Chu, Gilbert A. Gruber, John J. Oberly, andRichard L. Tallman. 22 Jan 65, 64p
Contract AF 19 (628)-4220,
Proj. AF-4608,
Task 460805
AFCRL 65-52

Descriptors: (*Epitaxial growth, Silicon), (*Vapor plating, Silicon), (*Silicon, Vapor plating), Pyrolysis, Thorium compounds, Dioxides, Sapphires, Silanes, Silicon compounds, Nitrides, Carbides, Metal films, Crystal lattices, Semiconducting films, Evaporation, Vacuum, Sputtering.

The pyrolysis of silane and the vacuum evaporation of silicon have been used for the deposition of silicon films on various substrates. These techniques could minimize autodoping and diffusion effects. Silicon films have been deposited on oriented silicon, sapphire, and hexagonal silicon carbide substrates by the pyrolysis of silane in a flow system using hydrogen as a diluent. Silicon films deposited on silicon substrates were of good crystal perfection. Silicon films deposited on sapphire and silicon carbide substrates were found to be epitaxial with respect to the substrates. Epitaxial silicon films of a few hundred Angstroms thickness were also deposited on silicon carbide substrates by vacuum evaporation. Exploration of new substrate materials, particularly those in the form of films deposited on silicon and other substrates, has been carried out. Thorium dioxide films have been deposited epitaxially on oriented silicon and fluorite substrates by vacuum evaporation. Silicon nitride films have been deposited on silicon substrate by nitridation and reactive sputtering. (Author)

AD-461 883 **Field 20D, 13J**
CFSTI Price: HC$15.90
Hydronautics, Inc., Laurel, Md.
EXPERIMENTAL INVESTIGATION OF A SUPERCAV- ITATING HYDROFOIL WITH UPPER SURFACE SPOILER FLAPS,
by Otto J. Scherer and Jacob Auslaender. Dec 64, 163p Technical rept. TR-343-2
Contract NObs-88164,
Task 1702

Descriptors: (*Hydrofoils, Fluid dynamic properties), Flaps, Cavitation, Angle of attack, Lift, Drag, Trailing control surfaces, Models (Simulations), Model tests, Design, Camber, Test methods, Leading edge flaps, Theory, Mathematical analysis, Base flow, Spoilers.

Results are presented of lift and drag measurements performed on a 2 1/2 in. chord model of the BuShips Parent Supercavitating Hydrofoil without flaps and with full span spoiler flaps. The tests were conducted in the high-speed, variable pressure, free surface, circulating water channel. They cover angles of atack ranging from 2.5 to 12.8 degrees, vapor cavitation numbers from 0.075 to 1.*8 and operating depths of 1/2 and 1 chord. The velocity during these tests was between 39 and 42 fps. Each of the three flaps parameters: flap deflection, flap/chord ratio, and flap trailing edge location, were varied in three steps while the other two parameters were held relatively constant. The results are presented in the form of graphs showing the variation of lift and drag with cavitation number and angle of attack. Graphs showing the reduction in lift due to the spoiler for each spoiler geometry and several cavitation numbers are also included. It is found that the upper surface spoiler flap is an effective way of reducing lift and that a discontinuity in lift at the ventilation inception angle can be avoided by proper selection of flap parameters. (Author)

AD-464 806 **Field 20D, 13J**
CFSTI Price: HC$3.60
Hydronautics, Inc., Laurel, Md.
INTENSITY OF CAVITATION DAMAGE ENCOUNTERED IN FIELD INSTALLATIONS,
by A. Thiruvengadam. Feb 65, 35p Technical rept. TR-233-7
Contract Nonr-3755 (00),
Proj. NR-062-293

Descriptors: (*Cavitation, Damage), (*Hydrodynamics, Cavitation), Propellers (Marine), Valves, Diesel engines, Combustion chamber liners, Hydraulic systems, Tur bines, Hydraulic pressure pumps, Nomographs, Pro tective treatments, Metals, Intensity, Erosion.

A nomogram called Cavitation Damage Intensity Estimator is presented for estimating cavitation damage intensities of field installations. This simple approach is based on an earlier definition of cavitation damage intensity as the power absorbed per unit area of the eroded material. Using this estimator and the data published for field installations, the damage intensity is estimated for ships' appendages, ships' propellers, valves, Diesel engine cylinder liners, hydraulic turbine runners and pumps. These estimates show that the intensities for propellers and valves can be several orders of magnitude higher than that for laboratory test devices. A summarized analysis shows the field experience and laboratory experience in the proper perspective in terms of their intensities. The possible usefulness of various protection methods are projected for various intensity levels. The threshold intensity of cavitation damage is found to be proportional to the endurance limit of metals. These ideas are only preliminary in nature and further coordinated field and laboratory efforts are suggested in this direction. (Author)

AD-465 696 **Field 20K, 13E**
CFSTI Prices: HC$4.60 MF$0.50
General Technology Corp., Elgin, Ill.
STRESS DISTRIBUTION AT TWO NORMALLY INTERSECTING CYLINDRICAL SHELLS,
by A. C. Eringen and E. S. Suhubi. Apr 65, 47p Technical rept. TR-3-7
Contract NObs-90157

Descriptors: (*Pipe fittings, Stresses), (*Structural shells, Pipe fittings), (*Couplings, Structural shells), Boundary value problems, Cylindrical bodies, Stiffened cylinders, Differential equations, Numerical analysis, Theory.

The boundary value problem concerned with the state of stress in two normally intersection circular cylindrical shells subjected to internal pressure is formulated. The differential equations of the two shells are solved for a small ratio of radii subject to edge conditions along the intersection curve and at the ends of the cylinders. The numerical results will be published in a later paper. (Author)

AD-469 036 **Field 20K, 11B, 11I, 11D**
CFSTI Prices: HC$3.60 MF$0.50
Army Missile Command, Redstone Arsenal, Ala. Physical Sciences Lab.
BIAXIAL FRACTURE STRESSES FOR GRAPHITE, CERAMIC, AND FILLED AND REINFORCED EPOXY TUBE SPECIMENS,
by Richard E. Ely. 30 Jun 65, 38p RR-TR-65-10
Proj. DA-1C024401A110

Descriptors: (*Stresses, Fracture (Mechanics)), (*Epoxy plastics, Stresses), (*Graphite, Stresses), (*Ceramic materials, Stresses), Glass textiles, Reinforcing materials, Tensile properties, Compressive properties, Boron compounds, Nitrides, Failure (Mechanics), Theory, Pipes, Guided missile com pounds, Talc, Composite materials.

Identifiers: Steatite, Biaxial stresses.

Ultimate biaxial stress results are compared with several failure theories for two high density graphites, a steatite, and a filled epoxy-resin. The maximum strain energy theory appeared best for correlating the results if a single theory is used for all stress states. Data given for boron nitride and two grades of glass-cloth, reinforced epoxy resins are meager. All results are for tubular test specimens loaded at room temperature by means of internal fluid pressure and axial loads. (Author)

C13.46-18-23 **Field 20N, 17B**
CFSTI Price: MF$0.75
National Bureau of Standards, Boulder, Colo. Inst. for Telecommunication Sciences and Aeronomy.
QUARTERLY RADIO NOISE DATA, JUNE, JULY, AUGUST, 1964,
by W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. 20 Nov 65, 91p NBS TN-18-23
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50.

Descriptors: (*Noise (Radio), Data), Radio interference, Global communication systems, Atmospherics, Tables.

Radio noise measurements are being made at eighteen stations in a world-wide network operated in a co-operative program co-ordinated by the Environmental Science Services Administration. The locations of these stations are shown on a map. The tabulated values are based on three basic parameters of the noise; these are the mean power, the mean envelope voltage, and the mean logarithm of the envelope voltage.

N66-10075 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Aarhus Univ. (Denmark). Inst. of Physics.
RANGE CONCEPTS AND HEAVY ION RANGES. NOTES ON ATOMIC COLLISIONS. II,
by J. Lindhard, M. Scharff, and H. E. Schiott. 1963, 46p
Copenhagen, Kongelige Danske Videnskobernes Selskab, 1963, Med. Vol. 33 n14.

Descriptors: *Heavy ion.

N66-10187 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
Tokyo Univ. (Japan). Inst. for Nuclear Study.
ANALYSIS OF THE HIGH-ENERGY JETS. PART IV- FOUR-MOMENTUM TRANSFER AND TRANSVERSE MOMENTUM OF RECOIL NUCLEON,
by S. Hasegawa and N. Yajima. 21 Dec 64, 14p INSJ-84

Descriptors: *Jet, *Momentum transfer, *Nucleon, *Recoil proton.

N66-10194 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
Laboratoire de Physique Theorique et Hautes Energies, Orsay (France).
APPLICATION OF THE ISOBARIC MODEL TO THE NUCLEON COMPTON EFFECT,
by N. X. Hai. Sep 65, 17p TH-110

Descriptors: *Compton effect, *Isobar, *Nucleon.

N66-10208 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
A NUMERICAL SOLUTION OF THE GAMMA TRANSPORT EQUATION APPLIED TO CONCRETE SLABS,
by H. Penkuhn. 1965, 19p EUR-2448.E

Descriptors: *Concrete, *Slab, *Transport equation.

N66-10368 Field 20D
CFSTI Prices: HC$1.00 MF$0.50
British Telecommunications Research, Ltd., Taplow (England).
MEASURING TECHNIQUES FOR FLUID DEVICES, PAPER D2,
by D. J. Craft. 1965, 16p
Prepared for presentation at Intern. Conf. on Fluid Logic and Amplification (1st), Brit. Hydromech. Res. Assoc. and Coll. of Aeron., Cranfield, England 8-9 Sep 1965.

Descriptors: *Measuring apparatus, *Fluid mechanics.

N66-10369 Field 20D
CFSTI Prices: HC$1.00 MF$0.50
Societe Bertin et Cie, La Garene-Colombes (France).
MECHANICAL CHARACTERISTICS OF A PURE FLUID RESPIRATOR WITH CURVED WALLS, PAPER F3,
by M. Kadosch and C. Pavlin. 1965, 11p
Prepared for presentation at Intern. Conf. on Fluid Logic and Amplification (1st), Brit. Hydromech. Res. Assoc. and Coll. of Aeron., Cranfield, England, 8-9 Sep 1965.

Descriptors: *Fluid switching element, *Mechanical property, *Wall flow, *Artificial respiration.

N66-10454 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
International Centre for Theoretical Physics, Trieste (Italy).
POSITION AND NEGATON PLANE WAVES,
by I. Saavedra. Apr 65, 13p IC-65-38

Descriptors: *Electron energy, *Particle mass, *Plane wave.

N66-10455 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
International Centre for Theoretical Physics, Trieste (Italy).
PROPER TIME FORMULATION OF THE ELECTRON THEORY II- ELECTROMAGNETIC INTERACTIONS AND CONSTANTS OF MOTION,
by I. Saavedra. Apr 65, 12p IC-65-43

Descriptors: *Electromagnetic interaction, *Electron spin, *Time factor, *Angular momentum.

N66-10469 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
International Centre for Theoretical Physics, Trieste (Italy).
ON THE MASS FORMULA FOR SU (6),
by M. A. Rashid. Apr 65, 6p IC-65-46

Descriptors: *Baryon, *Meson, *Symmetry.

N66-10470 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
International Centre for Theoretical Physics, Trieste (Italy).
NUCLEON-NUCLEON SCATTERING IN U (12) SYMMETRY,
by D. A. Akyeampong and R. Delbourgo. 4 May 65, 7p IC-65-50

Descriptors: *Nucleon-nucleon scattering, *Symmetry, *Theoretical physics.

N66-10502 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
International Centre for Theoretical Physics, Trieste (Italy).
SYMMETRIES OF STRONG INTERACTIONS,
by A. Salam. Oct 1964, 19p ICTP-64/1, CONF-550-91

Descriptors: *Physics (Gen), *Symmetry.

N66-11626 Field 20K
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
PRESSURE DISTRIBUTION AND BUBBLE FORMATION INDUCED BY LONGITUDINAL VIBRATION OF A FLEXIBLE LIQUID-FILLED CYLINDER,
by T. J. Overcamp and R. J. Schoenhals. 17 Sep 65, 59p NASA-TM-X-53353

Descriptors: *Bubble, *Pressure distribution, *Vibration effect, *Liquid-filled shell, *Longitudinal wave.

N66-11629 Field 20D
CFSTI Prices: HC$3.00 MF$0.75
Advisory Group for Aeronautical Research and Development, Paris (France).
MECHANISM OF NOISE GENERATION IN THE TURBULENT BOUNDARY LAYER,
by S. Childress, J. Laufer, and J. E. F. Williams. Nov 64, 87p AGARDOGRAPH-90

Descriptors: *Turbulent boundary layer, *Wave equation, *Acoustic radiation.

N66-11718 Field 20I
CFSTI Prices: HC$1.00 MF$0.50
Sydney Univ. (Australia). School of Physics.
MAGNETOHYDRODYNAMIC IONIZING SHOCK WAVES IN A CONDUCTING MEDIUM,
by B. Green and R. M. May. Feb 65, 20p TR-17, NP-15157

Descriptors: *Conducting medium, *Ionization, *Wave propagation, *Magnetohydrodynamic wave, *Shock wave propagation.

N66-12381 Field 20M
CFSTI Prices: HC$3.00 MF$0.50
Naval Research Lab., Washington, D. C.
HIGH-TEMPERATURE PROPERTIES OF CESIUM,
by C. T. Ewing, J. R. Spann, J. P. Stone, R. R. Miller, and E. W. Steinkuller. 24 Sep 65, 51p NRL-6246
Contract NASA Order C-76320
NASA CR-68381,
AD 622227

Descriptors: *Cesium, *High temperature research, *Liquid-vapor interface, *Thermophysics.

N66-12441 Field 20M
CFSTI Prices: HC$4.00 MF$1.00
National Bureau of Standards, Boulder, Colo.
BOILING HEAT TRANSFER FOR OXYGEN, NITROGEN, HYDROGEN, AND HELIUM,
by E. G. Brentari, P. J. Giarratano, and R. V. Smith. 20 Sep 65, 124p NBS-TN-317
Contract NASA Order R-45
NASA CR-68614

Descriptors: *Boiling, *Forced convection, *Heat transfer, *Cryogenic fluid, *Free convection.

N66-13502 Field 20N
CFSTI Prices: HC$2.00 MF$0.50
Weapons Research Establishment, Salisbury (Australia).
A METHOD FOR THE ROUTINE DETERMINATION OF RADAR REFRACTION CORRECTIONS,
by B. Davies, and R. H. Evans. Aug 65, 37p WRE-TN-TRD-13

Descriptors: *Differential equation, *Radar beam, *Radio wave refraction, *Refractive index.

N66-13504 Field 20L
CFSTI Prices: HC$3.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
THE USE OF PULSED REACTORS IN THE FIELD OF NEUTRON AND SOLID STATE PHYSICS,
by W. Kley. 1965, 58p EUR-2538.E

Descriptors: *Fast reactor, *Nuclear physics, *Pulsed radiation, *Solid state physics, *Neutron source.

N66-13535 Field 20N
CFSTI Prices: HC$1.00 MF$0.50
Institut Franco-Allemand De Recherches, St. Louis (France).
VISUALISATION OF WAVE PROPAGATION IN IMPULSE-LOADED BARS,
by E. David, R. Schall, and H. Schardin. 23 Feb 63, 19p ISL-T-20/63

Descriptors: *Bar, *Propagation velocity, *Optico-photographic stress measurement, *Stress wave.

N66-13652 Field 20I
CFSTI Prices: HC$1.00 MF$0.50
European Atomic Energy Community, Brussels (Belgium).
NOTES ON LOW FREQUENCY PLASMA OSCILLATIONS (ANODE OSCILLATIONS AND FORCED RELAXATION OSCILLATIONS),
by J. C. Terlouw. Apr 65, 17p NP-15445

219-841 O - 66 - 20

Descriptors: *Cesium plasma, *Plasma instability, *Low frequency, *Plasma oscillation, *Relaxation.

N66-13864 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
Atomic Energy Establishment, Winfrith (England). Reactor Group.
AN EXPERIMENTAL COMPARISON BETWEEN FORCED CONVECTION BURN-OUT IN FREON 12 FLOWING VERTICALLY UPWARDS THROUGH UNIFORMLY AND NON-UNIFORMLY HEATED ROUND TUBES,
by D. F. Elliott, G. F. Stevens, and R. W. Wood. May 65, 19p AEEW-R-426

Descriptors: *Convective heat transfer, *Forced convection.

N66-13913 Field 20I
CFSTI Prices: HC$1.00 MF$0.50
Sydney Univ. (Australia). School of Physics.
PREIONIZATION AND SHOCK WAVE IONIZATION PROCESSES IN SUPPER I, ALFVEN WAVE STUDIES. CURRENT INDUCED INSTABILITY, A 2 MM INTERFEROMETER, AND LASERS.
Ninth six-monthly progress report, 1 Jan. 1965, 7p NP-15355

Descriptors: *Alfven wave, *Ionization, *Shock wave, *Interferometer, *Laser.

N66-14050 Field 20N
CFSTI Prices: HC$3.00 MF$0.50
Radio Propagation Unit, National Physical Lab., New Delhi (India).
IONOSPHERIC DATA.
Mar 64, 55p RRC-A106

Descriptors: *Table, *Wave propagation, *Ionospheric propagation.

N66-14100 Field 20A
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Huntsville, Ala. Geo. C. Marshall Space Flight Center, Aero-Astrodynamics Lab.
GROUND LEVEL ACOUSTICAL FOCI IN A THREE-LAYERED ATMOSPHERE,
by W. H. Heybey, 7 Oct 65, 47p NASA-TM-X-53344

Descriptors: *Acoustics, *Atmosphere, *Point source, *Sound wave, *Focus.

N66-14258 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
Denver Univ., Colo. Dept. of Physics.
LOW ENERGY IONIZATION OF ARGON ATOMS BY ARGON ATOMS,
by R. C. Amme and H. C. Hayden. Jul 65, 8p
Grant NsG-392
NASA CR-69016

Descriptors: *Argon, *Atomic collision, *Electron, *Ionization cross section.

N66-14287 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
Minnesota Univ., Minneapolis.
KINETIC CONSIDERATIONS OF THE STRENGTH OF ORIENTED SOLIDS,
by C. C. Hsiao, H. H. Kausch von Schmeling, and C. S. Ting. Sep 65, 9p TR-102
Contracts NGR-24-005-070, AT (11-1)-532
NASA CR-68970

Descriptors: *Kinetics, *Mechanical property, *Solids.

N66-14289 Field 20F
CFSTI Prices: HC$2.00 MF$0.50
Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
FEASIBILITY OF OBJECTIVE COLOR SYSTEMS.
Final rept.,
by A. Anson. 13 Sep 65, 39p
Contract NASA Order R-47-009-002
NASA CR-68982

Descriptors: *Color perception, *Manned spacecraft, *Sensor, *Terrain.

N66-14294 Field 20L
CFSTI Prices: HC$3.00 MF$0.75
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
TABULATED RESULTS OF CALCULATED MOLECULE-SURFACE INTERACTIONS,
by A. Bogan, Jr. Jul 64, 72p RM-237
Contract NASw-709
NASA CR-68976

Descriptors: *Molecular interaction, *Numerical analysis, *Solid surface.

N66-14295 Field 20M
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.
LABORATORY SIMULATION OF HYPERVELOCITY HEAT TRANSFER PROBLEM DURING PLANETARY ENTRY,
by N. S. Diaconis, J. S. Gruszczynski, and W. R. Warren, Jr. 1964, 83p
Contract NAS7-100
NASA CR-68977
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Prepared for presentation at Intern. Astronautical Congr. (15th), Warsaw, 7-12 Sep 64.

Descriptors: *Heat transfer, *Planetary entry, *Hypervelocity, *Simulation.

N66-14765 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Cleveland, Ohio. Lewis research Center.
RESULTS OF HYPERVELOCITY IMPACTS INTO SPACE RADIATOR MATERIALS,
by N. Clough, S. Lieblein, and J. H. Diedrich. 1965, 40p
NASA TM-X-52142
Presented at the 1st Rankine Cycle Space Power Systems Specialists Conf., Sponsored by AIAA, eveland, 26-28 Oct 1965.

Descriptors: *Hypervelocity impact, *Material testing, *Space radiator.

N66-14767 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Cleveland, Ohio. Lewis Research Center.
THERMAL EMITTANCE BEHAVIOR OF SMALL CAVITIES LOCATED ON REFRACTORY METAL SURFACES,
by J. R. Branstetter and R. D. Schaal. 1965, 15p
NASA TM-X-52147
Presented at the Thermionic Conversion Specialists Conf., sponsored by IEEE, San Diego, Calif., 25-27 Oct 1965.

Descriptors: *Cavity, *Thermal emission, *Refractory metal.

N66-14768 Field 20M
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
POTASSIUM CONDENSING TESTS OF HORIZONTAL MULTITUBE CONVECTIVE AND RADIATIVE CONDENSERS OPERATING AT VAPOR TEMPERATURES OF 1250 DEG to 1500 DEG F,
by L. W. Acker, O. A. Gutierrez, D. B. Fenn, and N. J. Sekas. 1965, 28p
NASA TM-X-52148
Presented at the Rankine Cycle Space Power System Specialists Conf., sponsored by AIAA, Cleveland, 26-28 Oct 1965.

Descriptors: *Condenser, *Convective heat transfer, *Potassium, *Radiative heat transfer, *Vapor.

N66-14771 Field 20M
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
AN EXPERIMENTAL STUDY OF THE CONING CHARACTERISTICS OF MERCURY ING IN SINGLE TUBES,
by J. A. Albers, and D. Namkoong, Jr. 1965, 35p
NASA TM-X-52151
Presented at The Rankine Cycle Specialists Conf., red by AIAA, Cleveland, 26-28 Oct 1965.

Descriptors: *Condenser, *Mercury vapor, *Tube.

N66-14773 Field 20I, 21C
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
STATUS OF LARGE VACUUM FACILITY TESTS OF MPD ARC THRUSTOR,
by R. E. Jones and E. L. Walker. 1965, 26p
NASA TM-X-52155
Presented at the AIAA Aerospace Sci. Meeting, (3rd), New York, 24-26 Jan 1966.

Descriptors: *Ammonia, *Hydrogen fuel, *Magneto plasma *Test facility, *Thrustor.

N66-14776 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
RADIAL DENSITY AND TEMPERATURE PROFILES AT THE ION CYCLOTRON WAVE RESONANCE POINT,
by R. Krawec. 1966, 26p
NASA TM-X-52159
Presented at The AIAA Plasma Dyn. Conf., Monterey, Calif., 2-4 Mar 1966.

Descriptors: *Density distribution, *Ion temperature, *Radial distribution, *Resonance probe, *Temperature profile, *Ion cyclotron, *Langmuir probe, *Magnetic probe, *Plasma probe.

N66-14780 Field 20L
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Huntsville, Ala. George C. Marshall Space Flight Center.
THE EFFECT OF TRANSDUCER IMPEDANCE ON DYNAMIC MEASUREMENTS,
by I. P. Vatz. 7 May 65, 36p
NASA TM-X-53254
Prepared in cooperation with Brown Eng. Co., Inc., Huntsville, Ala.

Descriptors: *Impedance, *Dynamic response, *Frequency range, *Transducer, *Vibration measurement.

N66-14781 Field 20M
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration. Huntsville, Ala. George C. Marshall Space Flight Center.
A SET OF EXPERIMENTS IN THERMAL SIMILITUDE,
by J. K. Harrison and B. P. Jones. 18 Oct 65. 70p
NASA TM-X-53346

Descriptors: *Thermal simulation, *Scale model, *Similitude law.

N66-14782 Field 20K
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration. Huntsville, Ala. George C. Marshall Space Flight Center.
VIBRATION AND ACOUSTIC ANALYSES, SA-FLIGHT.
8 Dec 65. 100p
NASA TM-X-53366

Descriptors: *Acoustic vibration, *Flight test, *Rocket flight, *Saturn I (SA-10) launch vehicle, *Vibration measurement.

N66-14913 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
A PRELIMINARY THERMAL DISTORTION ANALYSIS OF THE PROPOSED AOSO EXPERIMENT SUPPORT STRUCTURE,
by D. E. Gray. Sep 65. 38p X-430-65-493
NASA TM-X-55360

Descriptors: *Mathematical model, *Aoso, *Distortion, *Thermal property.

N66-14953 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
A GENERAL CATEGORY OF SOLUBLE NUCLEON-MESON CASCADE EQUATIONS,
by F. S. Alsmiller. Dec 65. 39p ORNL-3746
Contract W-7405-eng-26, NASA Order R-104
NASA CR-69210

Descriptors: *Cascade, *Kernel function, *Nucleon, *Particle collision, *Meson.

N66-14954 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
Northwestern Univ., Evanston, Ill. Structural Mechanics Lab.
SOME GENERAL CONSIDERATIONS CONCERNING THE DESTABILIZING EFFECT IN SYSTEMS.
Technical rept.,
G. Herrmann and S. Nemat-Nasser. Jun 65. 26p TR-65-2
Contract NsG-605
NASA CR-69209

Descriptors: *Gyroscopic stability, *Linear system, *Mathematics (Gen), *Viscous damping.

N66-14955 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
TRANSMISSION AND REFLECTION OF ELECTROMAGNETIC WAVES NORMALLY INCIDENT ON A WARM PLASMA.
Scientific rept.,
by C. Comstock. 10 Dec 65. 33p Scientific-257
Contract NSG-134
NASA CR-69208

Descriptors: *Electromagnetic wave, *Plasma, *Wave reflection.

N66-15201 Field 20D
CFSTI Prices: HC$5.00 MF$1.00
Iowa Engineering Experiment Station.
FLUID VELOCITY PROFILE DEVELOPMENT FOR TURBULENT FLOW IN SMOOTH ANNULI.
Doctoral thesis,
T. H. Okiishi. Jul 65. 154p
Contract NsG-62-60
NASA CR-68501

Descriptors: *Annulus, *Turbulent flow, *Velocity profile.

NN66-15229 Field 20K
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration. Langley Station, Va. Langley Research Center.
INVESTIGATION OF THE USE OF PENETROMETERS TO DETERMINE THE CAPABILITY OF DUST MATERIALS TO SUPPORT BEARING LOADS,
by B. R. Hanks and J. L. McCarty. Jan 66. 92p
NASA-TN-D-3200

Descriptors: *Accelerometer, *Dust, *Load factor.

N66-15242 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
California Univ., La Jolla.
GALACTIC X-RAY SOURCES,
by G. R. Burbidge, R. J. Gould, and W. H. Tucker. 1965. 12p
Contract NsG-357
NASA CR-60520

Descriptors: *Bremsstrahlung, *Galactic radiation, *Synchrotron radiation.

N66-15250 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
Northwestern Univ., Evanston, Ill., Technological Inst.
ON THE STABILITY EQUILIBRIUM OF CONTINUOUS SYSTEMS,
by G. Herrmann and S. Nemat-Nasser. 1964.
Grant NsG-605
NASA Cr-60702

Descriptors: *Linear system, *Elastic stability, *Viscoelasticity.

N66-15296 Field 20J
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
HYPERVIRIAL THEOREMS AND THE HELLMAN -FEYNMAN THEOREM IN DIFFERENT COORDINATE SYSTEMS,
by S. T. Epstein. 12 Feb 65. 8p WIS-TCI-78
Contract NsG-275-62
NASA CR-60915

Descriptors: *Hellmann-Feynman theorem, *Coordinate system, *Virial theorem.

N66-15297 Field 20F
CFSTI Prices: HC$3.00 MF$0.75
Princeton Univ., N. J. Dept. of Biology.
IMAGE CONTRAST AND PHASE MODULATED LIGHT METHODS IN POLARIZATION AND INTERFERENCE MICROSCOPY. INSTRUCTION MANUAL FOR THE PAR EPM-1 PHOTOELECTRIC POLARIZING AND INTERFERENCE MICROSCOPE,
by R. D. Allen. 1964. 88p
Contract NASr-159
NASA CR-60392

Descriptors: *Electron microscope, *Light modulator, *Modulation technique, *Phase modulation.

N66-15315 Field 20A
CFSTI Prices: HC$4.00 MF$1.00
National Aeronautics and Space Administration, Huntsville, Ala. Geo. C. Marshall Space Flight Center.
INTERACTION OF STRUCTURE AND LIQUID IN THE SOUND SUPPRESSOR SYSTEM,
by H. F. Bauer. Jan 66. 130p NASA-TN-D-3178

Descriptors: *Liquid, *Noise suppressor, *Sound, *Spacecraft structure, *Saturn V launch vehicle.

N66-15316 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
BALL LIGHTNING CHARACTERISTICS,
by W. D. Rayle. Jan 66. 40p NASA-TN-D-3188

Descriptors: *Lightning, *Brightness, *Point impact.

N66-15361 Field 20D
CFSTI Prices: HC$2.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
SOME STUDIES OF NONLINEAR LATERAL SLOSHING IN RIGID CONTAINERS,
by H. N. Abramson, W. H. Chu, and D. D. Kana. Jan 66. 41p
Contract NASR-94-03
NASA CR-375

Descriptors: *Container, *Rigid structure, *Sloshing.

N66-15484 Field 20K
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Geo. C. Marshall Space Flight Center, Huntsville, Ala.
A NEW APPROACH TO THE EXPLANATION OF THE FLUTTER MECHANISM,
by M. H. Rheinfurth and F. W. Swift. Jan 66. 31p NASA-TN-D-3125

Descriptors: *Structural stability, *Torsion, *Bending, *Flutter, *Mathematical model.

N66-15487 Field 20M
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
AN EXPERIMENTAL INVESTIGATION OF HEAT TRANSFER TO TURBULENT FLOW IN SMOOTH TUBES FOR THE REACTING N204-N02 SYSTEM,
by A. F. Presler. Jan 66. 51p NASA-TN-D-3230

Descriptors: *Heat transfer, *Turbulent flow, *Nitrogen tetroxide.

N66-15490 Field 20C
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
MINIMUM PROPELLANT CONSUMPTION ROUND -TRIP TRAJECTORIES TO MARS FOR

CONSTANT-THRUST, CONSTANT-SPECIFIC-IMPULSE VEHICLES WITH OPTIMUM COASTING PERIODS,
by L. H. Fishbach and C. L. Zola. Jan 66, 34p
NASA-TN-D-3233

Descriptors: *Interplanetary trajectory, *Mars (Planet), *Propellant, *Thrust, *Specific impulse

N66-15493 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Edwards, Calif. Flight Research Center.
EXPERIMENTAL INVESTIGATION OF THERMAL-BUCKLING CHARACTERISTICS OF FLANGED, THIN-SHELL LEADING EDGES,
by J. M. Jenkins and W. J. Sefic. Jan 66, 31p
NASA-TN-D-3243

Descriptors: *Aerodynamic heating, *Leading edge, *Thermal buckling, *Thin walled shell.

N66-15494 **Field 20K**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
THEORETICAL ELASTIC MISMATCH STRESSES,
by R. H. Johns. Jan 66, 25p NASA-TN-D-3254

Descriptors: *Mechanics (Gen), *Shell, *Stress

N66-16434 **Field 20J**
CFSTI Prices: HC$3.00 MF$0.75
Laboratoire de Physique Theorique et des Hautes Energies, Orsay (France).
NON RELATIVISTIC PARTICLES AND WAVE EQUATIONS,
by J. M. Levy-Leblond. Nov 65, 65p TH-112

Descriptors: *Magnetic moment, *Nuclear spin, *Relativistic particle, *Wave equation, *Maxwell equation, *Quantum mechanics.

N66-16928 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Deutsche Forschungsanstalt fer luft - und Raumfahrt, Brunswick (West Germany). Institut fer Flugzeugbau.
BUCKLING MODES OF ORTHOTROPIC CIRCULAR CYLINDERS UNDER AXIAL COMPRESSION FOR VARIOUS COMBINATIONS OF STIFFNESS PARAMETERS,
by H. Appel. Aug 65, 31p DLR-FB-65-47

Descriptors: *Buckling, *Circular cylinder, *Axial compression, *Critical loading, *Orthotropic cylinder.

N66-16974 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Southwest Research Inst., San Antonio, Tex.
SLOSHING STUDIES.
Quarterly progress rept. no. 16, 1 Jan - Mar 65,
by H. N. Abramson. 5 Apr 65, 12p
Contract NAS8-1555
NASA CR-70183

Descriptors: *Fuel tank, *Harmonic analysis, *Perforated plate, *Pressure measurement.

N66-16975 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
State Univ. of Iowa, Iowa City.
SOME GENERAL ASPECTS OF GEOMAGNETICALLY TRAPPED RADIATION,
by J. A. Van Allen. Jan 66, 34p Rept. no. 66-2
Grant NsG-233
NASA CR-70185
Presented at the Advanced Study Inst. on Radiation trapped in the earth's magnetic field, Bergen, Norway, Aug 16 - Sep 3 1965.

Descriptors: *Radiation belt, *Theoretical physics, *Geomagnetic field, *Trapped radiation.

N66-16976 **Field 20L**
CFSTI Prices: HC$2.00 MF$0.50
Rice Univ., Houston, Tex.
SPIN-LATTICE INTERACTION IN RUBY MEASURED BY ESR IN UNIAXIALLY STRESSED CRYSTALS,
by P. L. Donoho, R. B. Hemphill, and E. D. McDonald. 1965, 28p
Grant NsG-6
NASA CR-70186

Descriptors: *Electron spin, *Hamiltonian, *Spin-lattice relaxation, *Chromium, *Ruby, *Single crystal.

N66-16977 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
JUNCTURE STRESS FIELDS IN MULTICELLULAR SHELL STRUCTURES. VOLUME VI. ANALYSIS OF MULTICELLULAR PROPELLANT PRESSURE VESSELS BY THE STIFFNESS METHOD.
Final rept.,
by C. T. Chen and P. Stern. Nov 65, 31p M-77-65-7
Contract NAS8-11480
NASA CR-70187

Descriptors: *Boundary value problem, *Coordinate transformation, *Matrix algebra, *Shell, *Structural dynamics.

N66-17066 **Field 20I**
CFSTI Prices: HC$5.00 MF$1.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
INTERACTIONS OF SPACECRAFT AND OTHER MOVING BODIES WITH NATURAL PLASMAS,
by C. K. Sterkin. Dec 65, 198p JPLAI/LS-541
Contract NAS7-100
NASA CR-70362
Prepared in cooperation with Joint Publications Research Service, Washington, D. C.

Descriptors: *Abstract, *Magnetosphere, *Spacecraft environment, *Bibliography, *Ionospheric composition.

N66-17067 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
A PROBLEM ON SUMMATION OVER HISTORIES IN QUANTUM MECHANICS,
by A. M. Arthurs. 17 Jan 66, 20p WIS-TCI-144
Contract DA-11-022-ORD-2059, Grant NsG-275
NASA CR-70312

Descriptors: *Amplitude, *Quantum mechanics, *Sum.

N66-17068 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
ON THE ELECTRONIC ENERGY OF A ONE-ELECTRON DIATOMIC MOLECULE NEAR THE UNITED ATOM,
by W. B. Brown and E. Steiner. 18 Jan 66, 35p
WIS-TCI-151
Grant NsG-275
NASA CR-70313

Descriptors: *Diatomic molecule, *Electric energy, *Ground state, *Molecular energy.

N66-17069 **Field 20J**
CFSTI Prices: HC$2.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
ON THE FACTORIZATION OF SECULAR EQUATIONS BY GROUP THEORY,
by W. B. Brown. 21 Jan 66, 27p WIS-TCI-154
Grant NsG-275
NASA CR-70314

Descriptors: *Factor analysis, *Group theory, *Quantum mechanics.

N66-17071 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.50
Northwestern Univ., Evanston, Ill. Gas Dynamics Lab.
THEORETICAL AND EXPERIMENTAL STUDIES OF MAGNETO-AERODYNAMIC DRAG AND SHOCK STAND-OFF DISTANCE.
Progress rept. 8, Jul 65-7 Jan 66.
1966, 54p
Grant NsG-547
NASA CR-70315

Descriptors: *Mach number, *Shock wave, *Specific heat, *Drag, *Magnetogasdynamics.

N66-17081 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana.
THEORETICAL AND EXPERIMENTAL STUDY OF THERMAL CONTACT RESISTANCE IN A VACUUM ENVIRONMENT.
Semiannual status rept. no. 8, Jun-Dec 65,
by A. M. Clausing. 7 Jan 66, 31p
Grant NsG-242
NASA CR-70339

Descriptors: *Heat resistance, *Contact resistance, *Vacuum.

N66-17083 **Field 20J**
CFSTI Prices: HC$3.00 MF$0.75
Florida Univ., Gainesville.
LINEAR ALGEBRA AND THE FUNDAMENTS OF QUANTUM THEORY,
by P. O. Lowdin. 1 Jul 64, 97p
Grant NsG-512
NASA CR-70300
Prepared in cooperation with Uppsala Univ. (Sweden). Quantum Chem. Group Tech. Note No. 125, Preprint No. 65.

Descriptors: *Algebra, *Linear equation, *Quantum theory.

N66-17084 **Field 20J**
CFSTI Prices: HC$3.00 MF$0.50
Florida Univ., Gainesville.
QUANTUM THEORY OF TIME-DEPENDENT PHENOMENA TREATED BY THE EVOLUTION OPERATOR TECHNIQUE,
by P. O. Lowdin. 15 Jun 65, 83p
Grant NsG-512
NASA CR-70301
Prepared in cooperation with Uppsala Univ. (Sweden). Quantum Chem. Group. Tech. Note no. 100, Preprint no. 78.

Descriptors: *Quantum theory, *Relativity theory, *Differential operator, *Time dependency.

N66-17098 **Field 20K**
CFSTI Prices: HC$4.00 MF$0.75
Florida Univ., Gainesville. Dept. of Engineering Science and Mechanics.
RESEARCH INVESTIGATIONS OF BULKHEAD CYLINDRICAL JUNCTIONS EXPOSED TO COMBINED LOAD, CRYOGENIC TEMPERATURES AND PRESSURE. PART I. EXPERIMENTAL STUDIES,
by C. A. Sciammarella. Nov 65, 109p
Contract NAS8-5199
NASA CR-70326

Descriptors: *Cylindrical tank, *Liquid oxygen (Lox), *Stress concentration, *Saturn S-IV stage, *Scale model.

N66-17101 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Stevens Inst. of Tech., Hoboken, N. J. Dept. of Physics.
AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF TURBULENCE INSTABILITIES AT PLASMA-MAGNETIC FIELD INTERFACES.
Semiannual rept.,
by W. H. Bostick. Oct 65, 27p SIT-P174/12/65/
Grant NsG-596
NASA CR-70318

Descriptors: *Coaxial accelerator, *Magnetic field, *Plasma turbulence, *Interface.

N66-17112 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Univ. of Pittsburgh Pa.
FLOW SEPARATION AND REATTACHMENT IN AN UNEQUAL ELBOW,
by R. K. Duggins. 15 Jul 65, 31p SRCC-10
Grant NsG-416
NASA CR-70338

Descriptors: *Elbow, *Flow separation, *Wake.

N66-17214 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.75
AVCO-Everett Research Lab., Everett, Mass.
THE EFFECT OF COHERENT RADIATION ON THE STABILITY OF A CROSSED-FIELD ELECTRON BEAM.
Research rept. no. 213,
by R. H. Levy. Jun 65, 65p
Contract NASw-1101
NASA CR-70372

Descriptors: *Coherent radiation, *Crossed field, *Electron beam, *Stability.

N66-17219 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
California Inst. of Tech., Pasadena.
BINDING ENERGY AND STABILITY OF SPHERICALLY SYMMETRIC MASSES IN GENERAL RELATIVITY,
by J. M. Bardeen. 1965, 22p
Contract Nonr-220 (47), Grant NGR-05-002-028
NASA CR-60916

Descriptors: (*Relativity, *Stability, *Symmetrical body, *Binding energy.

N66-17222 **Field 20N**
CFSTI Prices: HC$1.00 MF$0.50
Alabama Univ. Research Inst., Huntsville.
ON DIELECTRIC LENSES,
by N. F. Audeh and H. Y. Yee. 1965, 8p
Grant NsG-608
NASA CR-60259

Descriptors: *Lens, *Dielectric material, *Electric field, *Electromagnetic propagation.

NBS-TN-311 **Field 20C, 9B**
CFSTI Price: MF$0.50
National Bureau of Standards, Boulder, Colo. Radio Standards Lab.
COMPUTATION OF THE PERMEABILITY AND PERMITTIVITY OF A RELATIVELY SMALL RING SAMPLE IN A TOROIDAL COIL.
Technical note,
by Eric G. Johnson, Jr. 25 Jan 66, 41p
Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.30 as C13.46:311.

Descriptors: (*Ferrites, Permeability (Magnetic)), (*Permeability (Magnetic), Determination), (*Dielectric properties, Determination), (*Programming (Computers), Electrical impedance), Coils, Magnetic cores, Costs, Time, Rings.

Identifiers: FORTRAN, Toroidal coils.

The derivation and the FORTRAN machine program are presented for a formula which gives the impedance of a partially filled toroid coil. This formula shows the relationship of the complex permeability and permittivity of the ring material, the dimensions of the coil and sample, and the frequency of the applied electromagnetic field. Limitations of the formula due to proximity of the ring and coil, range of permeability and permittivity of the ring, and uniformity of the coil winding are considered. The cost of the program in terms of computer time is also considered. The principal value of the formula is to accurately determine the permeability and permittivity of ferrites. (Author)

PB-169 348 **Field 20J, 20C**
CFSTI Prices: HC$8.60 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE A TEMPERATURE FINIE D'UN SYSTEME D'ONDES DE SPIN EN INTERACTION DANS UNE APPROXIMATION SELF-CONSISTANTE. (Self-Consistent Treatment of Interacting Spin Waves at Finite Temperatures).
Doctoral thesis in French,
by Micheline Bloch. 1966, 82p CEA-R-2821
Text in French; Attached Summary in English.

Descriptors: (*Nuclear spins, Field theory), (*Ferromagnetic materials, Nuclear spins), (*Antiferromagnetism, Nuclear spins), Atomic energy levels, Quantum mechanics, Potential theory, Vector analysis, Temperature, France.

Identifiers: Ferrimagnetic materials, Spin waves.

A spin wave theory is developed where account is taken of spin wave interactions at finite temperatures. The temperature dependence of the spin wave energies and of the magnetization is derived. The theory is developed for ferro-, ferri-, and antiferromagnets. (Author)

PB-169 361 **Field 20L, 11B**
CFSTI Prices: HC$5.60 MF$0.75
Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CHALEUR SPECIFIQUE ELECTRONIQUE DE CARBURES DE METAUX DE TRANSITION (Electronic Specific Heat of Transition Metal Carbides).
Doctoral thesis in French,
by Rolland Conte. 1965, 59p CEA-R-2854
Text in French; Attached Summary in English.

Descriptors: (*Carbides, Specific heat), (*Band theory of solids, Carbides), (*Titanium compounds, Carbides), (*Tantalum compounds, Carbides), Refractory materials, Metallography, Resistance (Electrical), X-ray diffraction analysis, Test equipment, Temperature sensitive ele ments, Germanium, Cryogenics, France.

Identifiers: Tantalum carbides, Titanium carbide.

The experimental results making it possible to define the band structure of transition metal carbides having a NaCl structure are still very few. Measurements were made of the electronic specific heat of some of these carbides of varying electronic concentration (TiC, either stoichiometric or non-stoichiometric, TaC and mixed (Ti, Ta) -C). The main characteristics (metallography, resistivity, X-rays) are given of the samples and we describe the low temperature specific heat apparatus which was built is described. In one of these we use helium as the exchange gas. The other is set up with a mechanical contact. The two use a germanium probe for thermometer. The measurement of the temperature using this probe is described, as well as the various measurement devices. The results are presented in the form of a rigid band model and show that the density of the states at the Fermi level has a minimum in the neighbourhood of the group IV carbides. (Author)

PB-169 535 **Field 20I**
CFSTI Prices: HC$3.60 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
LA SONDE A RESONANCE (Resonance Probe),
by Dimitri Lepechinsky, Andre Messiaen, and Paul Rolland. Jan 66, 33p CEA-R-2945
Text in French; Attached Summary in English.

Descriptors: (*Plasma medium, Probes (Electromagnetic)), (*Probes (Electromagnetic), Plasma physics), Resonance, Plasma sheath, Theory, Mercury, Vapors, Langmuir probes, France.

Identifiers: Plasma probes.

After a brief review of papers recently published on the resonance probe as a tool for plasma diagnostics, the main features of a newly proposed theory are recalled. In this theory the geometry of the resonator formed by the probe, the ion sheath and the plasma is explicitely taken into account with the quasi-static and cold plasma approximations. Some new results emerging from this theory are indicated and a comparison with experimental data obtained with a spherical probe placed in a quiescent mercury-vapour plasma is made. A good quantitative agreement has been observed, indicating that the theory is satisfactory and justifying the assumptions involved. Nevertheless it appears that in some cases experimental results can only be interpreted when non collisional damping phenomena are taken into consideration. (Author)

21. PROPULSION AND FUELS

N66-13707 **Field 21G**
CFSTI Prices: HC$2.00 MF$0.50
Aeronautical Research Labs., Melbourne (Australia). Dept. of Supply.
AUSTRALIAN INTERESTS IN THE FUTURE OF THE SMALL PRIME-MOVER,
by D. R. Warren and M. Zockel. Aug 64, 42p
ARL/ME-262

Descriptors: *Australia, *Combustion, *Mechanical system, *Reciprocating engine.

N66-14286 **Field 21F**
CFSTI Prices: HC$3.00 MF$0.75
United Aircraft Corp., East Hartford, Conn. Research Labs.

ANALYTICAL STUDY OF HYDROGEN TURBOPUMP CYCLES FOR ADVANCED NUCLEAR ROCKETS.
Progress rept., 15 Sep 64-15 Sep 65,
by T. S. Latham, G. H. McLafferty, H. H. Michels, andR. Roback. Sep 65, 80p D-910093-19
Contract NASw-847
NASA CR-68988

Descriptors: *Hydrogen, *Inlet pressure, *Turbo pump, *Nuclear rocket.

N66-14779 **Field 21C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
A MERCURY ELECTRON-BOMBARDMENT ION THRUSTOR SUITABLE FOR SPACECRAFT STATION KEEPING AND ALTITUDE CONTROL,
by W. R. Kerslake, J. F. Wasserbauer, andP. M. Margosian. 1965, 39p
NASA TM-X-52163
Presented at AIAA Elec. Propulsion Meeting, (5th), San Diego, Calif., 7-9 Mar 1966.

Descriptors: *Electron bombardment, *Radial flow, *Attitude control, *Mercury (Metal), *Thrustor.

N66-15273 **Field 21B**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
STEADY STATE AEROTHERMOCHEMISTRY FOR LIQUID BIPROPELLANT ROCKET MOTORS,
by V. D. Agosta and S. Z. Burstein. 1 Oct 64, 40p Rept. no. 64.3
Contract NAS7-100
NASA CR-68846

Descriptors: *Aerothermochemistry, *Bipropellant, *Combustion physics, *Drop test, *Fuel spray, *Liquid drop, *Ballistics, *Fuel combustion, *Liquid propellant rocket engine.

N66-15280 **Field 21I**
CFSTI Prices: HC$2.00 MF$0.50
Reaction Motors Div., Thiokol Chemical Corp., Denville, N. J.
GELLING OF LIQUID OXYGEN FLUORIDE.
Final rept. 18 Nov 63-17 Nov 64,
by A. J. Beardell. Dec 65, 39p RMD-5039-F
Contract NAS3-4180
NASA CR-54220

Descriptors: *Gel, *Liquid oxygen (Lox), *Oxygen fluoride, *Stability.

N66-15360 **Field 21E**
CFSTI Prices: HC$3.00 MF$0.75
Boeing Co., Renton, Wash.
EXHAUST JET WAKE AND THRUST CHARACTERISTICS OF SEVERAL NOZZLES DESIGNED FOR VTOL DOWNWASH SUPPRESSION. TESTS IN AND OUT OF GROUND EFFECT WITH 70 DEG F AND 1200 DEG F NOZZLE DISCHARGE TEMPERATURES,
by C. C. Higgins, T. W. Wainwright, and D. P. Kelly Jan 66, 99p
Contract NASw-908
NASA CR-373

Descriptors: *Exhaust nozzle, *Jet thrust, *Wake, *Downwash, *Jet nozzle.

N66-15488 **Field 21C**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPERIMENTAL DATA ON PUMPING OF MERCURY ION BEAMS BY LIQUID-NITROGEN-COOLED CONDENSERS,
by E. A. Maslowski. Jan 66, 15p NASA-TN-D-3231

Descriptors: *Condenser, *Ion beam, *Liquid nitrogen, *Mercury (Metal), *Pumping.

N66-15495 **Field 21F**
CFSTI Prices: HC$4.00 MF$1.00
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
AN ACOUSTICAL STUDY OF THE KIWI B NUCLEAR ROCKET,
by C. M. Ailman, S. R. Lane, J. K. Manhart, andA. H. Marsh. Jan 66, 122p
Contract NASw-596
NASA CR-370

Descriptors: *Acoustics, *Energy conversion, *Pressure distribution, *Sound, *Kiwi B reactor, *Nuclear rocket, *Rocket engine.

N66-17075 **Field 21H**
CFSTI Prices: HC$2.00 MF$0.50
Martin Co., Denver, Colo.
STUDY OF CONTAMINATION OF LIQUID OXYGEN BY GASEOUS NITROGEN.
First quarterly rept. 1 Jul-30 Sep 64,
by D. A. Fester, P. J. Pizzolato, and J. R. Wilde. Oct 64, 41p CR-64-51 (Issue-3)
Contract NAS8-11337
NASA CR-70311

Descriptors: *Liquid oxygen (Lox), *Contamination, *Nitrogen.

N66-17077 **Field 21H**
CFSTI Prices: HC$4.00 MF$1.00
Lockheed-Georgia Co., Marietta. Nuclear Lab.
STUDY OF FUNDAMENTALS OF PRESSURANT DISTRIBUTOR DESIGN.
Final rept.
Jan 66, 124p ER-8275
Contract NAS8-5416
NASA CR-70304

Descriptors: *Gas pressure, *Heat transfer, *Liquid propellant, *Pressure distribution, *Propellant tank.

N66-17264 **Field 21H**
CFSTI Prices: HC$4.00 MF$1.00
Atlantic Research Corp., Alexandria, Va.
EVALUATION OF THE MARC 7 G1 AUXILIARY ROCKET MOTOR FOR USE OF THE ATLAS-CENTAUR VEHICLE.
Final rept. Mar-Oct 65,
by E. E. Elzufon, N. C. Jasper, and A. D. Mattox. Feb 66, 133p ARC-TR-PL-8634-00-1
Contract NAS3-7128-H
NASA CR-54660

Descriptors: *Engine testing, *Atlas centaur launch vehicle, *Solid propellant rocket engine.

PB-169 425 **Field 21E, 1C**
CFSTI Price: HC$5.60
Naval Ar Material Center, Philadelphia, Pa. Aeronautical Engine Lab.
CALIBRATION AND QUALIFICATION TESTS OF MC CULLOCH YO-100-4 ENGINE FOR ROTORCYCLE USE.
Final rept.,
by C. W. Shearer. 14 Dec 59, 53p NAMC-AEL-1625
Proj. TED-NAM-PP-2748.1
AD 232 315

Descriptors: (*Helicopter engines, Tests), Calibra tion, Feasibility studies, Internal combustion engines, Helicopter rotors, Helicopters.

Identifiers: McCulloch Motors YO-100-4 engines.

Average results of calibration tests of two McCulloch Motors YO-100-4 engines, mounted at 15 degrees from the vertical position to simulate the installation in the XRON helicopter, indicate that the maximum power output obtainable is 58.6 bhp. This power is 2.3 percent less than the manufacturer's specified rating of 60 bhp at 4000 rpm. The hand starting system proved inadequate, as it did not provide sufficient torque for consistant starting. A foot treadle arrangement, and special shut-down cleanout procedure were required for successful starting. Tests were terminated after three major failures prevented completion of the required 100-hour endurance test. It was concluded that the McCulloch Motors YO-100-4 engine, in its present state of development, is not sufficiently durable for its proposed use as a power plant for small man-carrying helicopters. (Author)

PB-169 803 **Field 21H, 11F, 21B**
CFSTI Prices: HC$1.10
Stanford Research Inst., Menlo Park, Calif.
TUNGSTEN AND ROCKET MOTORS.
Progress rept. no. 12, 1 Aug-30 Nov 60,
by Oliver Preston. 3 Jan 61, 5p
Contract NOrd-18619 (FBM),
Proj. SRI-SU-2785
AD 248 727

Descriptors: (*Tungsten, Rocket motors (Solid propellant)), (*Rocket motors (Solid propellant), Tungsten), (*Exhaust gases, Tungsten), Tungsten alloys, Aluminum compounds, Oxides, Erosion, Gases, Thermal stresses, Heating, Rocket motor nozzles, Chemical reactions, High temperature research.

This study is concerned with the interactions between tungsten and the exhaust constituents from solid-propellant rocket motors, where tungsten is used for such components as nozzle liners and jetevators. Since the solid propellants containing aluminum are of greatest current interest, the reactions between tungsten and molten alumina constitute a most important part of the investigation. Interactions between tungsten and rocket exhaust may be conveniently considered in three main categories: chemical, mechanical, and thermal. In the work performed to date, emphasis has been placed on the chemical interactions. The current phase of the project, Phase I, concerns the reactions between pure tungsten and the rocket exhaust constituents, as a basis for understanding the behavior of tungsten in these applications.

PB-169 935 **Field 21F, 18J, 13J**
CFSTI Prices: HC$3.00 MF$0.75
Nuclear Utilities Services, Inc., Washington, D. C.
THE ECONOMICS OF NUCLEAR FUEL IN MARITIME APPLICATIONS.
Summary rept.,
by N. B. McLeod. Apr 66, 68p NUS-265A
Prepared in cooperation with Babcock and Wilcox Co., Combustion Engineering Corp. and Westinghouse Electric Corp.

Descriptors: (*Merchant vessels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels), (*Nuclear powered vessels, Reactor fuels), (*Reactor fuels, Economics), Pressurized water reactors, Costs, Uranium, Reactor fuel processing, Power reactors, Design, Cargo ships.

Identifiers: Savannah nuclear cargo ship.

The report presents the results of a detailed investigation of the economics of nuclear fuel as a source of energy for merchant ships. The basic uncertainties, dependences, magnitudes and trends of fuel costs in present technology pressurized

water reactors are described. Correlation of maritime fuel cost elements and trends with a number of central station water reactor applications is established. The major elements of this report consist of: (1) a description of the basic dependencies of nuclear fuel cost to individual process costs and to design-controlled parameters; (2) the development of future trends in basic material prices, process costs, and fuel performance characteristics; (3) the presentation of fuel costs in representative central station reactors and definition of the cost trends and cost dependencies of these reactors as generally accepted by the electric utility industry; (4) the presentation of NS Savannah fuel costs and cost dependencies and comparison with normalized cost trends resulting from technical evaluation of several maritime reactors currently proposed by leading manufacturers.

22. SPACE TECHNOLOGY

AD-463 141 **Field 22B**
CFSTI Price: HC$1.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
CHARACTERISTICS OF THE GEOS A SPACECRAFT,
by R. R. Newton. 1965, 19p
Contract NOw-62-0604-c

Descriptors: (*Navigation satellites, Geodesics), (*Scientific satellites, Geodesics), Satellites (Artificial), Orbital trajectories, Radar equipment, Range finding, Beacons, Doppler systems, Telemeter systems, Transponders, Lasers, Reflectors, Optical systems, Tracking, Solar cells, Power supplies, Timing devices.

This paper describes the GEOS A spacecraft that will be launched by the National Aeronautics and Space Administration in the late summer of 1965. Characteristics of the optical beacons, the Doppler beacons, and of the timing signals are given in detail. (Author)

N66-10130 **Field 22B**
CFSTI Prices: HC$4.00 MF$1.00
Polish Academy of Sciences, Warsaw. Inst. of Geophysics.
ARTIFICIAL EARTH SATELLITES OBSERVATIONS AND INVESTIGATIONS IN POLAND,
by R. Teisseyre. 1965, 141p

Descriptors: *Satellite, *Poland.

N66-12733 **Field 22A**
CFSTI Price: MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
HISTORICAL SKETCH OF NASA.
1965, 57p NASA-EP-29
Hard copy available from Superintendent of Documents, G. P. O., Washington, D. C. 20402, $0.25.

Descriptors: *NASA program, *History, *Space program.

N66-13992 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.50
IIT Research Inst., Chicago, Ill. Astro Sciences Center.
LOW-THRUST TRAJECTORY AND PAYLOAD ANALYSIS FOR SOLAR SYSTEM EXPLORATION UTILIZING THE ACCESSIBLE REGIONS METHOD,
by A. L. Friedlander. Jul 65, 52p T-14
Contract NASR-65 (06)
NASA CR-68888

Descriptors: *Low thrust propulsion, *Payload, *Planetary exploration, *Trajectory analysis, *Solar system.

N66-14001 **Field 22A**
CFSTI Prices: HC$7.48 MF$2.25
Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
REPORT OF AUGUST 1965 TYCHO MEETING.
TG-1
Contract NSR-24-005-047
NASA CR-68896

Descriptors: *Conference, *Lunar surface, *Moon, *Selenography.

N66-14256 **Field 22B**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SATELLITE SITUATION REPORT. VOLUME 5, NO. 20.
31 Oct 65, 55p NASA-TM-X-57062, X-537-65-217

Descriptors: *Earth orbit, *Satellite, *Table.

N66-14291 **Field 22D**
CFSTI Prices: HC$3.00 MF$0.75
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
THERMAL ANALYSIS OF A MOBILE LUNAR LABORATORY,
by L. Conway and R. D. McGinnes. Oct 64, 73p R-122
Contract NAS8-5289
NASA CR-68980

Descriptors: *Atmospheric temperature, *Fortran, *Lunar mobile laboratory (Molab), *Thermodynamics.

N66-14770 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
A VARIATIONAL METHOD FOR MULTISTAGE LAUNCH VEHICLE OPTIMIZATION,
by O. F. Spurlock and F. Teren. 1965, 31p
NASA TM-X-52150
Presented at the AIAA Aerospace Sci. Meeting, (3rd) New York, 24-26 Jan 1966.

Descriptors: *Lagrange multiplier, *Launch vehicle, *Payload, *Variational calculus.

N66-14951 **Field 22D**
CFSTI Prices: HC$9.27 MF$3.00
Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
LAUNCH VEHICLE OPTIMIZATION, PHASE II. VOLUME II. TECHNIQUES DEVELOPMENT.
Sep 65, 627p GR-65-1089-11
Contract NASw-938
NASA CR-69212

Descriptors: *Computer program, *Launch vehicle, *Optimization, *Mathematical model, *Regression.

N66-15222 **Field 22C**
CFSTI Prices: HC$8.90 MF$2.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
EARTH-MOON TRAJECTORIES, 1965-70,
by V. C. Clarke, Jr., W. E. Kirhofer, R. J. Richard, and R. Y. Roth. 15 Nov 65, 590p JPL-TR-32-503-Rev-1
Contract NAS7-100
NASA CR-69223

Descriptors: *Earth-moon trajectory, *Mathematical model, *Trajectory analysis.

N66-15223 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
HIGH-ENERGY TRAJECTORIES FROM EARTH TO MARS AND RETURN,
by S. S. Dallas. 15 Dec 65, 59p JPL-TR-32-803
NAS7-100
NASA CR-69221

Descriptors: *Round-trip trajectory, *Earth, *Mars (Planet).

N66-15224 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
UTILIZING LARGE PLANETARY PERTURBATIONS FOR THE DESIGN OF DEEP-SPACE, SOLAR-PROBE, AND OUT-OF-ECLIPTIC TRAJECTORIES,
by M. A. Minovitch. 15 Dec 65, 85p JPL-TR-32-849
Contract NAS7-100
NASA CR-69222

Descriptors: *Deep space, *Solar probe, *Space trajectory program, *Planetary atmosphere.

N66-15225 **Field 22B**
CFSTI Prices: HC$5.00 MF$1.00
General Dynamics/Convair, San Diego, Calif.
PROJECT FIRE INTEGRATED POST FLIGHT, EVALUATION REPORT. FLIGHT NO. 11,
24 Sep 65, 180p GDC/BKF65-042
NASA CR-66000

Descriptors: *Fire project, *Postflight, *Space vehicle.

N66-15265 **Field 22B**
CFSTI Prices: HC$4.00 MF$0.75
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED MARINER SPACECRAFT. VOLUME I. SUMMARY.
28 Oct 64, 112p RAD-TR-64-36-Vol-1
Contract NAS7-100
NASA CR-69235

Descriptors: *Flyby mission, *Mariner space probe, *Mars excursion module (Mem), *Landing system, *Systems design.

N66-15266 **Field 22B**
CFSTI Prices: HC$6.00 MF$1.50
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED MARINER SPACECRAFT. VOLUME II. SYSTEMS ANALYSIS.
1964, 244p RAD-TR-64-36-Vol-2
Contract NAS7-100
NASA CR-69236

Descriptors: *Landing module, *Spacecraft design, *Mariner space probe, *Mars probe, *Systems analysis.

N66-15267 **Field 22B**
CFSTI Prices: HC$8.33 MF$2.50
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED MARINER SPACECRAFT. VOLUME III. LANDER DESIGN.
28 Oct 64, 533p RAD-TR-64-36-Vol-3
Contract NAS7-100
NASA CR-69237

Descriptors: *Mariner space probe. *Mars probe. *Spacecraft design. *Landing module.

N66-15268 Field 22B
CFSTI Prices: HC$7.00 MF$2.00
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED MARINER SPACECRAFT. VOLUME IV. FLYBY BUS DESIGN.
28 Oct 64, 384p RAD-TR-64-36-Vol-4
Contract NAS7-100
NASA CR-69238

Descriptors: *Flyby mission. *Mariner space probe. *Spacecraft design. *Surveyor project.

N66-15269 Field 22B
CFSTI Prices: HC$6.00 MF$1.50
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED MARINER SPACECRAFT. VOLUME V. DEVELOPMENT PLAN AND COST.
28 Oct 64, 233p RAD-TR-64-36-Vol-5
Contract NAS7-100
NASA CR-69239

Descriptors: *Cost estimate. *Landing module. *Spacecraft design. *Mariner space probe. *Mars probe.

N66-15305 Field 22A
CFSTI Prices: HC$2.00 MF$0.50
Douglas Aircraft Co., Inc., Calif. Missile and Space Systems Div.
EXPERIMENTAL INVESTIGATION OF ULTRA-HIGH VACUUM ADHESION AS RELATED TO THE LUNAR SURFACE.
Sixth Quarterly progress rept. 6, 1 Oct-31 Dec 65,
by J. A. Ryan. 1965. 30p
Contract NAS7-307
NASA CR-69246

Descriptors: *Adhesion. *Silicate. *Friction. *Lunar surface. *Surface roughness. *Ultra-high vacuum. *Vacuum pump.

N66-15362 Field 22C
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPLICIT GUIDANCE EQUATIONS FOR MULTISTAGE BOOST TRAJECTORIES.
by F. Teren. Jan 66. 41p NASA-TN-D-3189

Descriptors: *Atlas Centaur launch vehicle. *Steering. *Trajectory optimization. *Lunar trajectory. *Multi stage vehicle. *Spacecraft guidance.

N66-16751 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
European Space Technology Center, Delft (Netherlands).
A SUMMARY OF THE L. C. T. DESIGN STAGE FOR THE ESRO I SATELLITE,
17 Sep 65, 42p E1-01-127

Descriptors: *Satellite instrumentation. *Space craft design. *Telemetry. *Ionospheric composition.

N66-17046 Field 22C
CFSTI Prices: HC$2.00 MF$0.50
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM. VOLUME A. FRAMEWORK FOR SYNTHESIS.
21 Feb 66, 36p
Contract NASw-1215
NASA CR-70358, Vol. A

Descriptors: *Experiment design. *Manned orbital research laboratory (Morl). *Synthesis.

N66-17054 Field 22A
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART VIII. ADVANCED TECHNOLOGY AND SUPPORTING RESEARCH.
21 Feb 66, 126p
Contract NASw-1215
NASA CR-70347

Descriptors: *Manned orbital research laboratory (Morl). *Subsystem. *Experiment design. *Technology (Gen).

N66-17055 Field 22B
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART IX. OPERATIONS TECHNIQUES AND ADVANCED MISSIONS SPACECRAFT SUBSYSTEMS.
21 Feb 66, 122p
Contract NASw-1215
NASA CR-70351

Descriptors: *Spacecraft design. *Experiment design. *Manned orbital research laboratory (Morl). *Subsystem.

N66-17056 Field 22A
CFSTI Prices: HC$4.00 MF$1.00
IBM Federal Systems Div., Rockville, Md.
ORL EXPERIMENT PROGRAM, VOLUME B. PART X. EXTRAVEHICULAR ENGINEERING ACTIVITIES.
21 Feb 66, 178p
Contract NASw-1215
NASA CR-70344

Descriptors: *Extravehicular operation. *Experi ment design. *Manned orbital research laboratory (Morl).

N66-17060 Field 22C
CFSTI Prices: HC$2.00 MF$0.50
International Business Machines Corp., Rockville, Md. Federal Systems Div.
ORL EXPERIMENT PROGRAM. VOLUME C. GUIDELINES FOR COMPREHENSIVE FLIGHT PROGRAM.
21 Feb 66, 45p
Contract NASw-1215
NASA CR-70354

Descriptors: *Apollo spacecraft. *Experiment design. *Manned orbital research laboratory (Morl). *Mission planning.

N66-17062 Field 22A
CFSTI Prices: HC$5.00 MF$1.25
International Business Machines Corp., Rockville, Md. Federal Systems Div.
ORL EXPERIMENT PROGRAM, VOLUME C. ANNEX 2-GUIDELINES FOR COMPREHENSIVE FLIGHT PROGRAM.
21 Feb 66, 210p
Contract NASw-1215
NASA CR-70353

Descriptors: *Astrophysics. *Manned orbital research laboratory (Morl). *Spacecraft orbit. *Experiment design.

N66-17063 Field 22A
CFSTI Prices: HC$2.00 MF$0.50
International Business Machines Corp., Rockville, Md. Federal Systems Div.
ORL EXPERIMENT PROGRAM. VOLUME D-SUMMARY OF RESULTS.
21 Feb 66, 42p
Contract NASw-1215
NASA CR-70352

Descriptors: *Earth orbit. *Experiment design. *Manned orbital research laboratory (Morl).

N66-17078 Field 22B
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
ON THE ENGINEERING PORTION OF A RESEARCH PROGRAM TO DEVELOP A ZERO-G, DRAG-FREE SATELLITE AND TO PERFORM A GYRO TEST OF GENERAL RELATIVITY IN A SATELLITE.
Semiannual status rept. no. 4,
by R. H. Cannon, Jr. and B. O. Lange. Nov 65, 28p
Grant NsG-582
NASA CR-70305

Descriptors: *Satellite control. *Zero gravity. *Air cushion vehicle. *Control system.

N66-17109 Field 22A
CFSTI Prices: HC$3.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-34, VOLUME VI. FOR THE PERIOD MAY 1, 1965 TO JUNE 30, 1965. SPACE EXPLORATION PROGRAMS AND SPACE SCIENCES.
31 Jul 65, 57p JPL-SPS-37-34-Vol-6
Contract NAS7-100
NASA CR-70335

Descriptors: *Surveyor project. *Failure. *Mariner project. *Ranger project.

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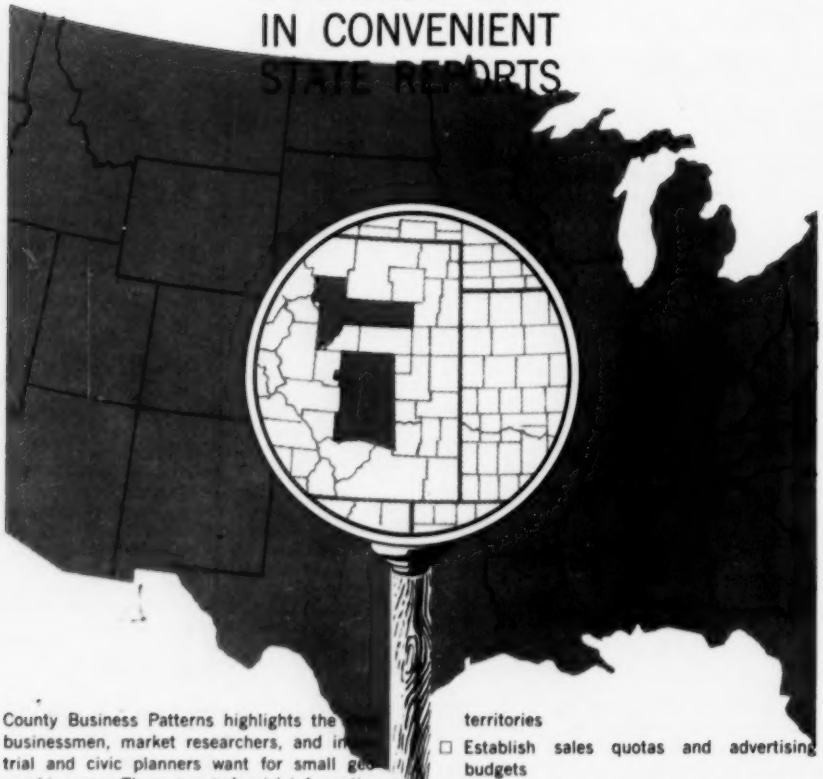

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